Marine Review

The National Publication Covering the Business of Transportation by Water

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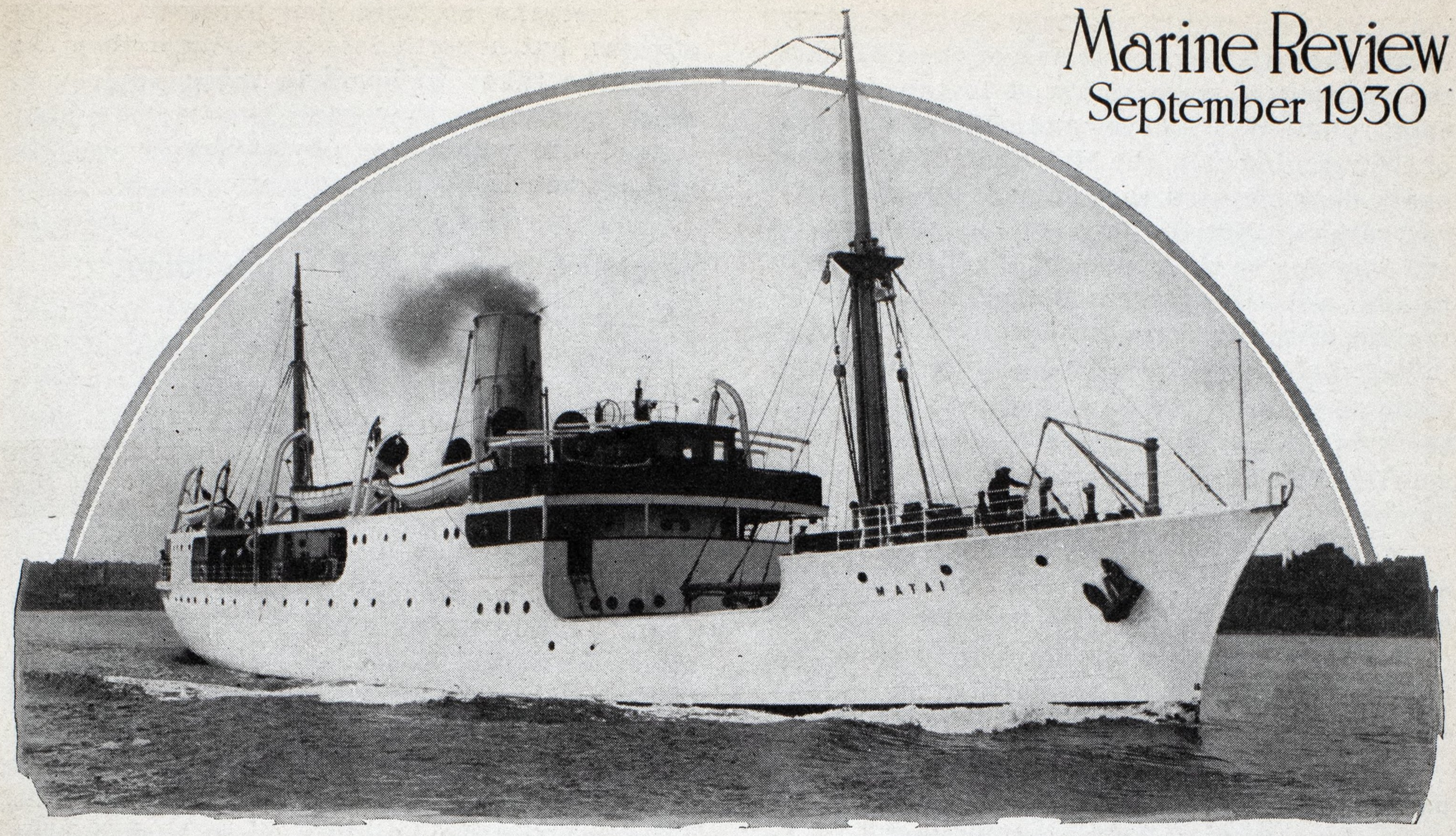
Marine Review
September 1930



Recently Completed Twin Screw Lighthouse and General Service Steamer—Built by R. & W. Hawthorn, Leslie & Co. Ltd. for the New Zealand Government. Also to be Used as a Yacht by Government Officials. *See Page 60 for Description*

«EDITORIAL»

Structural Not Human Failure Seen in Loss of Tahiti

AGAIN a disaster at sea, this time fortunately without loss of life, comes to emphasize the need of eternal vigilence. All of the facts have not been established. It is clear, however, that the human element functioned according to the best traditions.

The twin screw steel passenger steamer TAHITI, owned by the Union Steamship Co., Ltd. of New Zealand, while in the South Pacific en route from New Zealand to San Francisco, 460 miles from Rarotonga, Cook Islands, her next port of call, lost her starboard propeller and tailshaft. Water flooded number three and four holds. The accident happened on Aug. 14. At first there was some hope that the vessel could be saved and heroic efforts were made to keep her afloat.

The nearest vessel and the first one to reach the TAHITI was the Norwegian freighter PENYBRYN. There being no immediate danger of the TAHITI sinking the PENYBRYN stood by to await the arrival of the Matson liner VENTURA. then 700 miles away, but steaming under forced draft for the disabled vessel. The VENTURA reached the TAHITI on Aug. 17. Transfer of all passengers, 175 in number, was made safely in spite of a heavy swell. Listing of the TAHITI and her constant drifting made the transfer still more difficult. For a time the crew remained on board continuing their desperate efforts to keep her afloat. This was found to be hopeless and the crew, 142 in all, were finally forced to abandon the ship and take refuge on the VENTURA. With the PENBRYN still standing by after the passengers had been transferred, attempts were made to salvage such part of the cargo as might be possible. The letter mail was saved.

All reports of the accident praise the coolness and good judgment of Capt. A. T. Toten of the TAHITI. The discipline throughout was of the best. The situation was handled in an admirable way from beginning to end. Every precaution was taken by Captain Toten, first, for the safety of his passengers and second, to save if possible the ship. One report states that twice before the arrival of the freighter Captain Toten had ordered passengers into the lifeboats and each time as it became evident

that the ship would continue to stay afloat, rather than risking scattering of the lifeboats, the passengers were returned to the doomed ship. Capt. W. R. Meyer and officers and crew of the rescuing ship, the Matson liner VENTURA, again demonstrated the seamanship of American sailors. Not the least of the risk that he ran in going to the rescue of the TAHITI lay in taking a course across virtually uncharted regions of the Pacific off the well known lanes.

The following message from F. N. Davidson, radio operator of the TAHITI, was cleared from the VENTURA by permission of Captain Meyer shortly before her arrival at Pago Pago, Samoa.

"Passengers just got on VENTURA in time as all bulkheads started giving away and all holds were filled to the 'tween decks.

"The forward part of the ship was listing heavily, but nose much deeper than stern. She sank nose first.

"All the letter mail was saved but the newspapers were lost. Part of mail damaged by sea water. Sank at 4:30 p. m. Sunday."

The TAHITI was built in 1904 by A. Stephen & Sons, Ltd., Glasgow. Her registered dimensions were 460 feet in length; 55 feet 6 inches in beam; 35 feet in depth; and 7898 gross tons. She was powered by two triple expansion reciprocating steam engines. The boiler pressure was 180 pounds per square inch. Her load draft was 27 feet, 6 inches and she was classed *100-A in Lloyd's.

Here we have a ship 26 years old. The requirements for subdivision of passenger vessels as we know them today did not exist at that time. It is impossible to establish the facts at this time or to arrive at any definite conclusions. The dropping of one propeller and the loss of the tailshaft in a twin screw ship would not necessarily mean serious difficulties to a modern, well constructed vessel. Assuming the flooding of the stern recess and shaft alley with a proper watertight door at the engine room end of the alley and a substantially constructed watertight shaft tunnel the ingress of water would be confined to this comparatively small space.

The loss of the TAHITI brings out first, the necessity of continued careful examination of the tailshaft and propeller and even more rigid specifications, if possible, for the shaft material, the stern tube, stern bearings and entire stern structure to minimize the possibility of such an accident. Second, if an accident of this sort should happen, that the ship in way of the line shafting and tailshaft be so constructed and safeguarded as to limit flooding to a relatively harmless space. All of this, now that the accident has happened, seems obvious, but nevertheless it is urgent that the lesson be taken to heart in this case just as much as though there had been a terrifying loss of life which was obviated only by fate and seamanship of the highest order.

Foreign Countries Aid Shipbuilding

IN considering amendments to the merchant marine act of 1928 extending appropriate aid in the building of freight vessels for foreign service, the National Council of American Shipbuilders has collected information on aid given by foreign nations to their shipping. In the United States by the terms of the present act, mail contracts are being awarded for approved services. The natural effect of this law has been to aid in the building of the more elaborate fast, large, passenger and combination passenger and cargo vessels, while the backbone of the merchant marine, the freighter is not benefitted. To be sure, under approval by the shipping board, government loans may be advanced for the building of such ships, but this is not a sufficient aid to offset both the increased cost of building and the greater cost of operation.

Aids to shipowners for building ships have been arranged or are under discussion in Sweden, France, Belgium, Japan, Brazil, Germany and Italy. In view of the higher costs, due not to inefficiency, but to a higher standard of living which prevails in the United States, it is only fair and economically justified to provide some way of offsetting this differential in order to encourage the building up of a well rounded modern and efficient merchant marine. This should be done by amending the present act to cover all types of ships needed for this purpose.

George Washington's Bi-centennial

ELABORATE plans are under way to celebrate the bi-centennial of the birth of George Washington. This celebration is to be the greatest historical observance thus far known in history. It will be the most ambitious celebration ever undertaken in honor of an individual. Plans for this great event to take place throughout the year 1932 are under the auspices of the federal government.

In this connection it is interesting to recall Washington's deep appreciation of the great value to the country of a virile merchant marine. In a message to congress Dec. 8, 1790, he said:

"The disturbing situation of Europe and particularly the critical posture of the great

maritime powers, requires that we should not overlook the tendency of a war, and even of preparations for a war, among the nations most actively concerned in commerce with this country, to abridge the means, and thereby at least enhance the price, of transporting its valuable production to their proper markets.

"I recommend it to your serious reflection how far and in what mode it may be expedient to guard against embarrassments from these contingencies, by such encouragements to our own navigation as will render our commerce and agriculture less dependent upon foreign bottoms, which may fail us in the very moments most interesting to these great objects."

American Shipowners Should Cooperate

IN PRINCIPLE we are in sympathy with the proposal made by a well known Pacific coast shipowner and operator. It is his suggestion that an improvement is needed in the machinery for organized and cooperative efforts among those engaged in maritime affairs in order to better meet the exceptionally keen competition presented by foreign shipowners and operators for the carriage of American traffic.

He is thoroughly acquainted with the present operation of existing associations but feels that a better plan of action could be developed if for instance all American shipowners were organized into four groups geographically, such as Atlantic, Gulf, Pacific and Great Lakes. Every operator could find a community of interest in aligning himself with one or another of these groups, especially in view of the fact that each group would manage its own local problems without the slightest hint of outside interference. It is in trying to overcome difficulties in which an appeal to the administrative and legislative branches of the government is necessary that the four groups would unite in action.

Suggestions are made in some detail for carrying out this proposal. One of these is for the establishment of a marine bureau at Washington to be maintained by the four groups referred to. It is suggested that a competent executive secretary should represent each group in this bureau. Each secretary would be qualified to furnish accurate data on conditions affecting the business of any member shipowner of his group, or matters affecting the section he represented. Such information could be furnished members and committees of congress. The bureau of course would cooperate completely with the shipping board and all other agencies of the government having anything to do with the merchant marine. In this way the ideal of a united front on those questions concerning the merchant marine that affect all four groups would be nearly realized.

Such a plan of organization has merit and might work out very well. Certainly selection of secretaries for the separate groups will be a problem. Also there might be the feeling that, as in any case the ultimate authority is vested in the leading representative of the shipowner, the president or general manager or whatever he may be called, of the association of which that shipowner is a member, on all questions coming up affecting the shipowner's interest in which the government is involved this chief representative can and should deal directly with the government in Washington. However the details might be worked out. In general the plan proposed offers machinery for closer and more effective cooperation between the somewhat divergent groups that make up the American shipowners.

Proposing a 35-Knot Pacific Liner

DO they know what they are doing is a natural query when a 35-knot liner is suggested as a practical proposition. A West coast naval architect has made a study of such a proposal and prepared general arrangement sketches with particular emphasis on machinery layout. His proposal calls for a 35-knot Pacific liner to have a length overall of 768 feet; length on load water line, 724 feet; length between perpendiculars 696 feet; beam, 85 feet; loaded draft, 32 feet; and a displacement at this draft of 33,200 tons. The block coefficient is .59, and ratio of beam to length is 8.51.

The machinery installation is unique in some respects. Five propellers are to be used, a combination of a single and quadruple screw layout. Propellers are to be 15 feet 6 inches in diameter. The propelling machinery will be five sets of triple expansion steam turbines with reduction gears of a ratio of ten to one. These turbine sets are to be installed in two separate engine rooms immediately adjacent, two in the aft and three in the forward room. Total shaft horsepower is to be 150,000. Steam will be supplied by sectional express boilers with a working pressure of 500 pounds per square inch. The total heating surface is about 190,000 square feet. Total temperature with superheated steam is to be 700 degrees Fahr. and there are to be high vacuum condensers with ejectors. The layout shows four separate boiler rooms with four units in each room. It is not quite clear whether these are double

units which would give a total of 32 boilers or if single, 16 boilers.

In general appearance the vessel has a single large stack, two masts, sharply raked bow and long overhanging stern. Throughout the entire machinery space there is to be a double shell to a point above the water line. The proposed depth of the vessel to the boat deck is 75 feet 9 inches. There are six decks and the boat deck. Incidentally the inner shell is to be welded.

It is to be assumed that some attention has been given the economics of this problem. The cost of building and operating such a high speed vessel must be taken into account and balanced against her drawing power as a revenue producer. From an engineering point of view a vessel of this speed can undoubtedly be built and conceivably the growing wealth and increasing trade of the United States and the Orient might make such an outstanding ship commercially a success.

Insurance for Big Liners a Problem

APPARENTLY private insurance companies have reached the end of their rope when it comes to taking risks in such huge sums as are required to cover the latest ocean greyhounds and those to come. We are informed on the best authority from London that little difficulty was experienced in placing the building risk insurance on the BREMEN and the EUROPA, but that the capacity of the world market was severely tested when the time came to place the hull insurance of these two liners on delivery on the value of $12,500,000 each. It was simultaneously offered in Germany and Great Britain. Our informant thinks it unlikely that these huge amounts were ever fully placed and reinsurance underwriters who had held off reaped the harvest of their lives when reinsurances were subsequently offered on original conditions at double rates and on total loss only conditions at practically any price demanded.

It may well be asked how then is it going to be possible to place in the open market insurance on twice the value of the North German Lloyd liners? The only alternative is state assistance as for instance in the case of the proposed superliners for the United States lines. Europe, too, in spite of the feeling within marine insurance circles that such a paternalistic attitude would not be shown there, nor would business men welcome it, finally has had to come to government aid in insurance. In France a bill is up in connection with authorizing a loan of 700,000,000 francs for the construction of a new liner for the Compagnie Generale Transatlantique and the proposed bill anticipating the difficulty of insurance makes provision for the state to assume the total loss risk liability to the extent of 500,000,000 francs at a rate of 0.55 per cent. This would leave about $7,500,000 to place in the open market which should not prove difficult.

The British government has also come to the aid of the Cunard company in connection with the insurance of the new £6,000,000 liner now being laid down. The Cunard company has officially stated that insurance was the most important question to be settled before the order could be placed, although the builder, John Brown & Co., Clydebank, had been selected. Complete details will not be available until the necessary bill is submitted to parliament, but the British board of trade has agreed "to undertake at a premium such portion of the insurance of the steamer as cannot be accommodated by the market in the ordinary manner and at reasonable rates." Underwriters on both sides of the Atlantic naturally are greatly interested in the terms and conditions, whether they will be similar to the open market and whether the government intends to limit its participation in marine insurance to this one ship and possibly to the sister ship which may follow immediately.

Additional information will be available when the contract is actually underway and the order given for the building risk insurance. It is clear that this policy must be effected on the full contract value from the time of the laying of the keel. Another thing seems certain, that never again will marine reinsurance underwriters either here or abroad receive anything like the exceptional rates that were paid on the BREMEN and EUROPA reinsurances. So the insurance brokers really have the greatest cause for complaint which after all is not so bad for the shipowner.

Modernize Marine Steam Engineering

THE fuel economy of the diesel engine and its consequent wide application as power in ships of almost every class, including such major vessels as the recently completed BRITANNIC, for instance, has spurred the steam engineer to prodigious efforts to close the gap. It has long been recognized that much could be done in improving the economy of marine steam engineering plants. Though conditions are very different afloat and ashore, the intensive application of advanced engineering in the central station for some years past indicates possibilities for marine plants which are now beginning to be realized to some degree. Steam could not hope to hold its own afloat

without such progress having first been made.

The recently reported remarkable fuel economy of the Canadian Pacific liner EMPRESS OF JAPAN is a case in point. The records obtained on this vessel are said to be about 12 per cent better than the best results obtained by the Duchess class of vessels. At slightly over 21 knots, on a displacement of 27,400 tons the fuel per day for all purposes at 19,000 B.t.u. was 168.8 tons and the fuel per day for propulsion alone was 154 tons, for a total shaft horsepower of 26,100. Fuel per shaft horsepower for all purposes was .603 pound while the fuel per shaft horsepower for propulsion only was .552 pound. Boiler efficiency was 88.3 per cent. This vessel has recently completed a record passage across the Pacific from Yokohama to the British Columbia quarantine station in eight days, six hours and fifty-three minutes, a distance of 4814 miles.

The fine economies obtained in recently completed American ships with turbine electric drive demonstrate what can be done when modern engineering is applied. Several tankers now being built in American shipyards will have modern steam conditions, and economies comparable to that of the EMPRESS OF JAPAN.

Much, however, still needs to be done to modernize marine steam engineering practice on freighters and for small vessels of lesser power. It is inexcusable, nowadays to build a steam vessel no matter what size burning 1.25 pounds of oil per horsepower per hour and from 1.5 to 1.75 pounds of coal per shaft horsepower per hour. It is merely throwing money away because of engineering laxity.

Training for Merchant Officers

FACILITIES of the United States naval academy at Annapolis are suggested for the training of officers of the American merchant marine, by Ernest Lee Jahncke, assistant secretary of the navy. While as yet this is not a navy department program, he said he will urge its adoption. He added:

"Navy training is thorough in fundamentals. A ship of today is a very complicated structure and it is necessary that her officers have technical knowledge of her and her equipment as well as sea-going experience. The navy is interested in this subject because an efficient and well manned merchant marine is necessary and essential to the national defense."

Safety and Fighting Power Combined in Submarine V-5

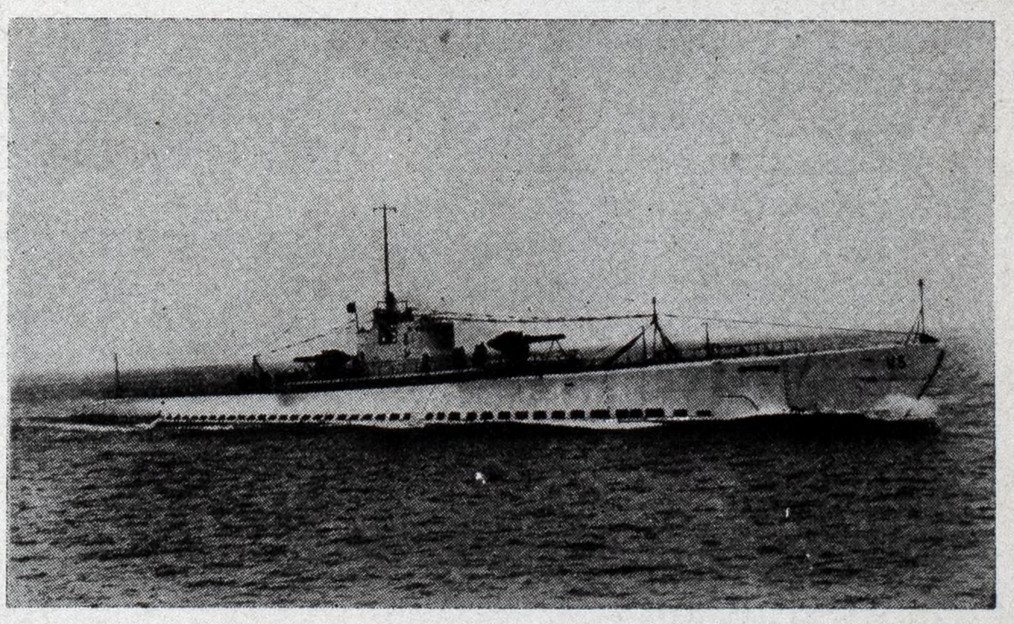
THE United States navy yard at Portsmouth, N. H. has established a high reputation for building submarines. Its latest product is the large seagoing submarine V-5 which, in command of Lieut. Commander John H. Brown, will soon join the Pacific submarine division No. 20 based on San Diego, Calif. The new submarine is 371 feet long, 33 feet beam and has a draft of 16 feet. Seven officers and 80 enlisted men comprise the crew.

Her propelling motors, furnished by the Westinghouse Electric & Mfg. Co. deliver power to each of two shafts either on the surface or submerged. By disconnecting them from the shafts they may be used as generators to charge large banks of storage batteries housed in a specially constructed compartment so that no gases can escape. Other specially designed machinery on board is driven throughout by Westinghouse electric motors.

Unlike earlier submarines the V-5 has commodious quarters for officers and men and the air is kept in perfect condition. Never before has a vessel of this type been so fully equipped with safety devices. Every member of the crew has an extra "lung" by which escape can be made without the use of elaborate equipment.

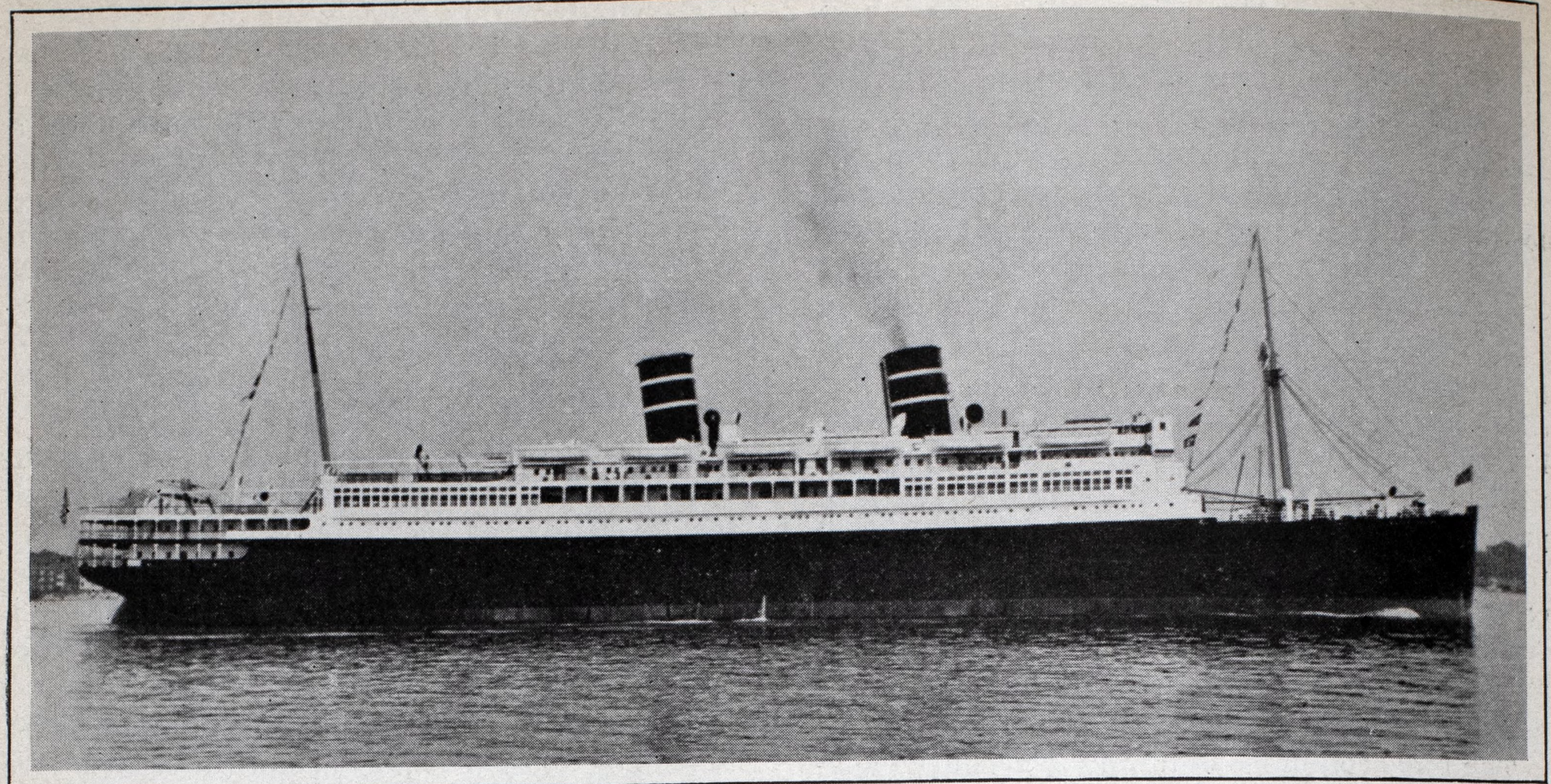
The three escape hatches, one through the conning tower and the other forward and aft from the torpedo room, are so arranged that in a case of emergency the entire crew can be saved. A series of compartments or escape locks are built in these hatches so that members of the crew with extra "lungs" may pass through. At the last lock there is a door which permits escape. When the men leave, this door can be closed from the inside, after which the water is pumped from this compartment and the other members of the crew advance into it.

In the control room are located a gyro pilot, periscopes and valves controlling all machinery on board. Between each bulkhead there is a complete set of automatic and manual controls which permit the vessel to be maneuvered from a number of places in



case of emergency. These controls also operate the ventilating system, the diving and raising machinery and also the communication system.

The V-5 will shortly proceed on her shakedown cruise to her base on the Pacific coast. Other officers on board are, Lieut. N. L. Damon, executive officer; Lieut. P. E. Pendleton, engineer officer; W. B. Thorp, gunnery officer; Lieut. H. B. Jarrett, assistant engineer; Lieut. W. B. Sampson, torpedo officer; and D. McGregor, communication officer.



Twin Screw Turbine Electric Liner Morro Castle—Maiden Voyage, New York-Havana Aug. 23—Sea Speed 20 Knots

Morro Castle Sails on First Voyage

New Liner Enters New York- Havana Run—Makes First Trip in 59 Hours—Sea Speed, 20 Knots—Luxurious Accommodations

IF YOU would like to travel between New York and Havana in a new ship at express speed in comfortable and luxurious quarters your only choice now will be the magnificent twin screw turbine electric Ward liner MORRO CASTLE, American built, owned and operated. With a sea speed of 20 knots and recorded speed of over 21 knots on her trials and with still more in reserve the estimated time from port to port of this new queen of the seas is 60 hours cutting 12 hours from the usual schedule.

On her maiden voyage from New York to Havana, sailing New York Aug. 23, the MORRO CASTLE bettered the anticipated time of 60 hours by arriving off Morro Castle light Havana harbor at 3 a. m., Aug. 26. The running time between the two ports was 59 hours and the average speed was 20 knots. This time is 13 hours better than the old schedule.

This vessel, launched March 5 and completed Aug. 16 is the first of two turbine electric express liners in the Ward line's $10,000,000 shipbuilding program underway at the Newport News Shipbuilding & Dry Dock Co. at Newport News Va. The second, a sister ship, the ORIENTE was launched May 15 and will enter service in November if, as is fully expected, the shipyard lives up to the splendid record set in building the MORRO CASTLE which was delivered two months ahead of schedule. These two liners hold the distinction of being the fastest, (though the SANTA CLARA of the Grace line may challenge this point) largest and costliest vessels yet built for the foreign trade under the provisions of the merchant marine act of 1928. They were designed by the noted New York naval architect, Theodore E. Ferris.

A critical and experienced inspection of the MORRO CASTLE will refute the rather absurd but all too prevalent motion of the superiority of foreign designers and shipbuilders. It may be said without qualification that she could not have been any better built in any shipyard abroad. In this vessel we do not believe that there has been any material compromise. By this is meant that she not only fully meets but goes beyond any reasonable demands of the trade in size, speed and accomodations. She is built without stint to anticipate the needs of the service for some years to come. Her machinery, very deliberately selected, represents the latest advance in marine engineering. Every practical safety feature known to the shipbuilding art has been applied. In the arrangement, finish and decoration of public rooms and passenger quarters the greatest pains have been taken to obtain the maximum of comfort and good taste. All in all the MORRO CASTLE represents that finest of man's objectives in life, the results of honest creative labor from stem to stern and from keel to truck. Those who have had a hand in her building may well be proud of their handiwork.

The new vessel and her sister ship the ORIENTE will undoubtedly do much to strengthen the commercial and social relations between the two Republics. Bringing Havana 12 hours nearer New York will not only help to greatly develop the winter tourist traffic but will also mean much financially to shippers in both countries in the greater facilities provided. Cuba's

S. S. Morro Castle
General Characteristics

Owner	Agwi Navigation Co.
Builder	Newport News S. B. & D. D. Co.
Naval Architect	Theodore E. Ferris
Launched	March 5, 1930
Completed	Aug. 16, 1930
Classification	American Bureau of Shipping
Length overall, feet, inches	508 0
Length between p.ps. ft. in.	482 0
Breadth, molded, feet, inches	70 9
Depth, molded, feet, inches	39 0
Displacement loaded, tons	17,500
Gross tonnage	11,520
Net tonnage	6,449
Passenger capacity, First Class	438
Passenger capacity, Tourist	95
Cargo capacity, cubic feet	339,600
Bunker fuel capacity, tons	1838
Speed in knots	20
Propellers, number	2
Drive	Turbine Electric
Machinery builder	General Electric Co.
Generators—A.C. each, kilowatts	6000
Horsepower, total @ 147 R.P.M.	18,000

Boilers, watertube, six, seven-furnace, Oil Burning, Babcock & Wilcox.

Auxiliary Generators—Three 500 K.W. General Electric.

interest in the advent of these splendid new ships is second only to that of the United States, and since loyalty in business and personal relations is a characteristic of the people, the Ward line will receive their patronage.

General characteristics of the MORRO CASTLE are enumerated for convenience in the accompanying table. Official sea trials were held off the Virginia capes on Aug. 9. She left the yard of the Newport News Shipbuilding & Dry Dock Co. at 4 a. m. An average speed of 21 knots was easily maintained during the trials. H. E. Cabaud, vice president of the Ward line was on board as an observer. The usual maneuvering tests, full speed, stopping, backing, figure eights and steering gear tryouts were carried out with complete success. Anchors were let out and hauled in and all special equipment such as gyro pilot, gyroscope, automatic sounding machine (Fathometer) radio direction finder etc. were inspected and found to be in fine working order.

Those on board included Homer L. Ferguson, president and Roger Williams, vice president of the Newport News Shipbuilding & Dry Dock Co., Theodore E. Ferris, and engineering representatives of the General Electric Co., builder of the turbine electric machinery. An unusual tribute was paid to the captain of the MORRO CASTLE Commodore J. E. Jones, by the shipyard in selecting him as master of the ship during the trials and before her delivery. An account of Commodore Jones' career appeared in the July issue of MARINE REVIEW. He has made 430 round trips in the New York-Havana service in addition to many voyages in the Mexican run.

The MORRO CASTLE arrived in New York on Aug. 17 and tied up at the Ward line's Pier 13 East river where preparations were completed for her maiden voyage beginning Aug. 23. A luncheon was given on board Aug. 19 to directors of the line, bankers, American and foreign shipping men, and shipbuilders. Franklin D. Mooney, president of the Atlantic, Gulf & West Indies Navigation Co. received the visitors on board.

Delivered Ahead of Time

Contract for the two vessels was signed Feb. 8, 1929. Delivery of the first vessel was promised for Nov. 1, 1930. The substantial saving in time in the delivery of the MORRO CASTLE was made possible by the perfected material control system established at the shipyard. In this system every step in fabricating and erecting is planned and a date fixed upon for completing that particular step.

Both vessels are built to American bureau of shipping rules for three-deck, complete superstructure, forecastle and long bridge. They are classed ✠ A-1-E with freeboard. The British board of trade requirements have also been met with, such as the general conditions arising from water-tight and oiltight compartments being flooded, also the requirements for discharge of garbage chutes etc. from spaces below the bulkhead deck, which are fitted with satisfactory closing valves. In case of main and auxiliary inlets where it is necessary to fit long necks to the inlet castings they are of steel and there is an emergency pump electrically driven supplied with power by the emergency lighting set which of course is located above the bulkhead deck. Many other similar details add to the safety of the vessel.

Frame spacing between frames 0 and 13 is 24 inches; between 13 and 45, 27 inches; between 45 and 174, 33 inches and 174 and 194, 24 inches. The sheer forward at the stem is eight feet and the sheer aft at the aft perpendicular is four feet. Displacement in sea water at 26 feet molded draft is about 15,870 long tons. The various decks are designated as follows beginning with the top house and bridge; sun deck, A; promenade deck, B; bridge deck, C; shelter deck, D; upper deck, E; and lower deck G.

General Description of Vessels

They are of three deck complete superstructure type, with combined forecastle head and long bridge forming flush deck forward. There is a double bridge and overhanging promenade deck which is a complete steel deck, as are also all other decks, including the sun deck inside of houses. All exposed decks are caulked wood decks, including the wings over navigating bridge, top of wheel and officers houses, engineers house, wireless house and forecastle head.

A bulbous bow and streamline balanced rudder reduce resistance. The lower section of the stem is a steel casting, the upper portion, rolled steel bar, the scarphing of the two parts occurs above the light waterline. The stern frame is of cast steel in five parts and of trough section, cast at the shipyard. The upper part is connected to the upper deck. It has two gudgeons to take the rudder pintles. All sections are fastened together with fitted bolts. The under side of the lower gudgeon is 6 feet above the keel of the ship, thus forming a space for the balanced rudder. The rudder frame is of cast steel and has two pintles with composition sleeve and lignum vitae bushings. Proper means have been taken to prevent the rudder from lifting. The weight of the rudder is carried by a combination rudder supporter, steady bearing and stuffing box located on the main deck. There is a cast steel rudder trunk extending from the stern frame to the main deck, through which the 18½-inch diameter wrought steel rudder stock works. The rudder and stock are joined by a horizontal palm with six 5 inch diameter fitted bolts. The rudder is filled with spruce, the arms and the plates were coated with bitumastic solution before being closed up.

There are nine watertight, transverse bulkheads extending up to the shelter deck forming ten subdivision compartments. The fore peak bulkhead extends up to the forecastle deck.

Deep fuel oil tanks are formed abreast the boiler rooms, extending from the bottom of the ship to lower and main decks. Settling tanks are built in from the tank top to cofferdams below main deck. Built in fresh water tanks are fitted at the after end of engine room, port and starboard, and outboard of the shaft tunnels below lower deck; culinary tanks are also fitted between shaft tunnels aft of the engine room bulkhead. There is a deep culinary tank also fitted just forward of the after peak bulkhead. Double bottom tanks are piped up for fuel oil and water ballast, also boiler feed and reserve fresh water.

Foundations for guns in suitable location have been approved by the navy.

All deck houses are of steel, as are also the companion hoods, and enclosures, skylights, domes, etc. There is a tier of deck houses on the promenade and sun decks, and on top of the the main house on the sun deck is the house for officers quarters, with the wheel house at the forward end, and a separate house for the engineers quarters amidship.

The wireless house is also on top of the sun deck house. There is a steel bulwark aft in way of the deck house on the shelter deck. The promenade deck is enclosed with storm windows of the Kearfott design, across the front and along each side to just forword of amidship. Then for about 125 feet there is open rail, forming a desirable space for deck chairs; aft of this the deck is again enclosed similar to the forward portion of this deck. The forward portion of these enclosures forms an enclosed promenade, while the after portion forms a deck ball room, which extends across the ship and encloses the veranda cafe and musicians platform. These windows are fitted above a low steel bulwark and channel rail. The windows are of the frameless type ¾ inch thick, with ½ inch thick glass transoms over each window. The transoms are arranged to open outboard and are provided with mechanical means to open and close them. The metal parts are of bronze and when closed are weathertight. All wood work and transoms is of teak and the bulwarks inside below the rail is paneled in teak and arranged in removable shutters in way of each window.

Cargo Handling Gear

There are two steel masts with wood topmast on each vessel. The steel masts are of welded construction throughout, there being no rivets used. The foremast is fitted with derrick table arranged to accomodate one 25-ton heavy lift steel derrick

and two 5-ton steel booms aft and three 5-ton steel booms forward. These booms are served by two double drum and two single drum winches of the Lidgerwood type electrically operated with General Electric motors.

There are nine cargo ports, on each side of the ship, three forward and four aft on upper tween deck and two forward on main tween deck. There are two passenger entrance ports on each side. One port and one starboard forward on bridge C deck and one port and one starboard aft on shelter D deck. Accommodation ladders are arranged at the after ports. There are two stowing or loading ports about amidship.

The lower level watertight doors that must be opened or closed for the operation of the ship while at sea are either vertical or horizontal sliding doors, gravity closing type, opened and closed by electric motor, with electric control from bridge, and at the doors, and with hand control above the bulkhead deck. These doors are also fitted with an alarm system at the door and with an electric indicating system of lights in the wheel house to indicate the position of the doors, open or closed.

Mail storage rooms are provided entirely enclosed in steel. The print shop is located amidship on upper E deck, and is fitted with metal type cases and racks and a motor driven printing machine.

There are ten 30-foot double end metallic life boats each of 70 person capacity and two additional powered life boats each of 58 person capacity. These boats are stowed under 12 sets of Welin-Maclachlan patent davits, which are electrically operated. The boats are carried at the sun deck level, which leaves the promenade B deck a splendid deck for the first class passengers.

Passenger Accommodations

Different architectural styles are employed in the treatment of the various spaces, but by the proper use of color, sharp contrasts have been avoided.

In the deck houses on the promenade B deck are the two lobbies, forward and aft, the library, writing room, lounge, first class smoking room and veranda cafe. All of these spaces have large casement windows, opening on the promenade deck, and permitting of an uninterrupted view out to sea.

The public lobbies, one forward and one aft extend through four decks, and are modernistic in treatment, with elevator service in each lobby. Stairways in hardwood with bronze balustrades and hardwood rails are built around these elevators. The bulkheads in the lobbies are modernistic in style and are very flat, veneered in rectilinear forms in mahogany, satin wood, ebony and rosewood.

Writing room and library are located on either side of the promenade deck, forward of the lounge. The architecture is classical French and the furniture is designed in the empire period. Painted walls are used in light cream, relieved by framed oil paintings. In the library, the lighting arrangements are subdued, with special lights in the bulkheads adjacent to the easy chairs, for the use of the individual reader.

First Class Dining Saloon

The first class lounge is of generous proportions, extending through two decks and having a mezzanine with an ample well opening surrounded by a bright bronze railing. The bulkheads are of white mahogany stained a soft brown with certain panels ornamented in color. The ceilings of the lounge proper and the mezzanine are painted in tones of cream, with certain panels and medallions containing painted decoration after the style of Watteau. This room is of the Louis XVI period, and the furniture, hangings, lighting fixtures, carpets, and other details have been especially designed, in the period, to suit the space. The hangings are in old-rose damask with furniture fabrics in coral and blue and old-gold. Mirrors, appropriately used, increase the brilliance of the room, and in front of these mirrors are console tables, on which are placed candelabra with silk shades. The color harmony is of particular interest in this room, which while degnified, is yet restful and inviting.

The smoking room is executed in walnut, with decorative painting in gold and color in the ceiling panels and on the soffits of the beams. The architectural style is the Italian renaissance where richness and color predominated. An imposing semicircular skylight is located over the central portion of the room, and in the ends are murals depicting scenes in Havana and New Amsterdam. The veranda cafe is a large room, practically forming part of the deck ball room. It has large casement windows and on three sides is enclosed by the deck ball room. The walls of the cafe are covered with painted decorations, very cool yet colorful.

The first class dining saloon is centrally located fore and aft on the shelter deck and seats 216 persons, with galley and pantries and all culinary working spaces on the same deck level. The tourist dining saloon and pantries are located just aft of the main galley being separated from it by the tourist main foyer. This of course permits close traffic and maintains all culinary and cooking arrangements with the one galley. The dining saloon extends through two decks with a mezzanine, and tall supporting pillars at the well opening. The room is painted in cream with decorated panels done in Pompeian motifs. In the ceiling of the mezzanine, above the well opening is an oval mural painting, 28 feet in length, and 18 feet wide, depicting the Perseus of mythology rescuing Andromeda. The furniture in this space is mahogany, covered in red and gold fabric, with old gold brocade curtains. Sliding sash cover the airports arranged to provide ample ventilation when the ports are open. Concealed lighting makes it possible to light these sash at night.

The electric fixtures are in gold finish without and with etched glass shades. On the sideboard are silver candelabra on which are silk shades. Cast iron railings painted and block and gold leaf with hardwood top rail around the mezzanine, heighten the beauty of this space.

Light antique oak in old English design is used throughout the public spaces for tourists which comprise the music room, smoke room, lobbies, stairways, and dining saloon. The furniture is likewise old English, and has a walnut finish. The curtains at the airports are Jacobean linen. In the dome of the tourist class dining saloon are four mural paintings in which ships and persons of the Elizabethan period are represented. This tourist accommodations is comparable to first class in many features. Portraits in oil are used in the dining saloon and music room, while old prints give a homelike appearance to other spaces.

The tourist promenade or fresh air deck is aft on the bridge deck. Tourist lounge and smoking room are also on the after bridge deck and the accommodations are aft on C, D and E decks.

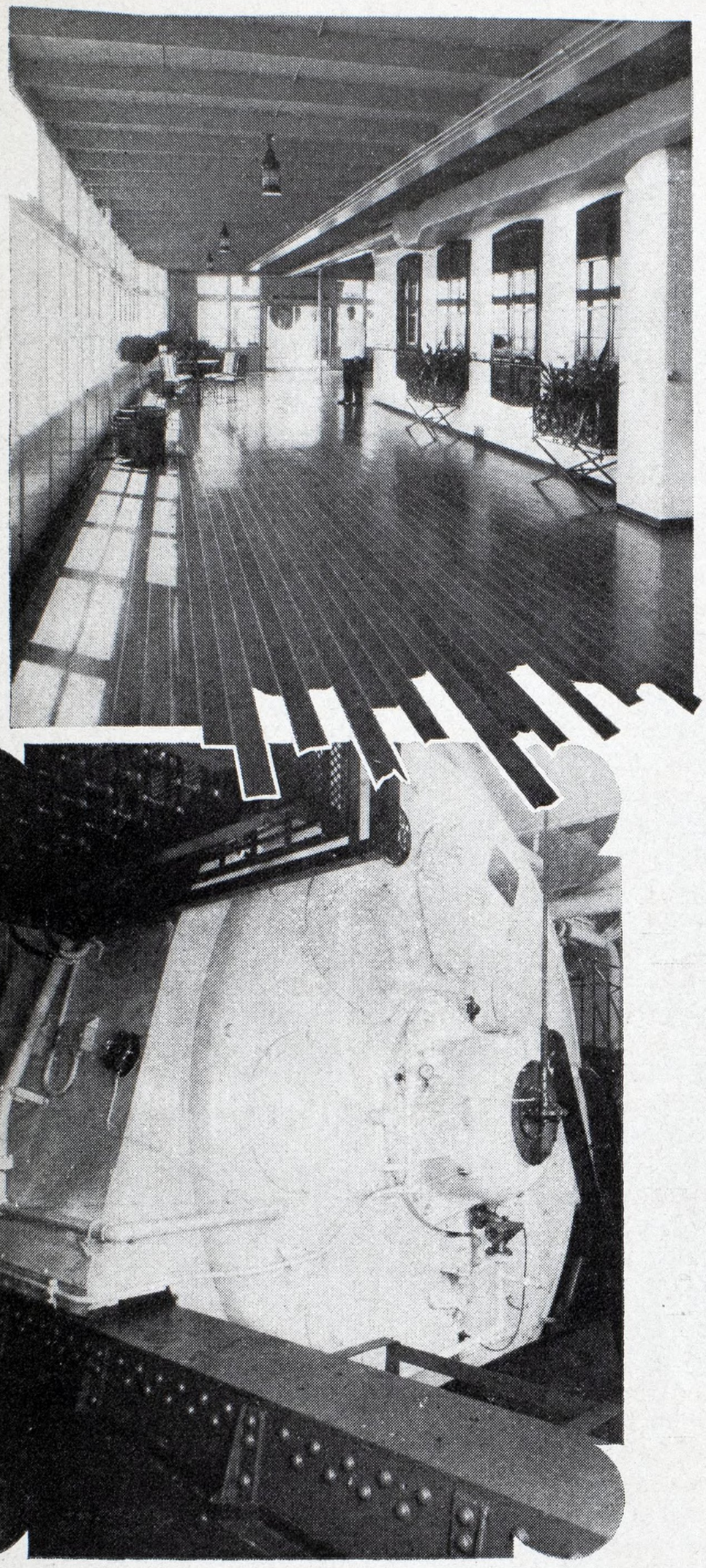
Special and Regular Staterooms

In the de luxe suites on C deck hardwood, and painted bulkheads are used alternately. Some of the furniture is hardwood, while in some rooms the chiffoniers, dressing tables, etc. are painted. Rich fabrics are used on the furniture, and for the hangings, but more delicate colors are used to avoid the suggestion of warmth, in the tropics.

The special and regular staterooms are generally alike in character, having painted bulkheads and furniture, principally in hardwood. In the special rooms, the deck is carpeted, and in the regular staterooms, rugs are used on a linoleum deck covering. The principal distinction between a special and regular stateroom, is that the former has more individual bath facilities. The same attention to detail has been paid in these spaces as in the larger public rooms: fabrics are colorful where required, and there is generally a note of freshness in the furnishing of the staterooms.

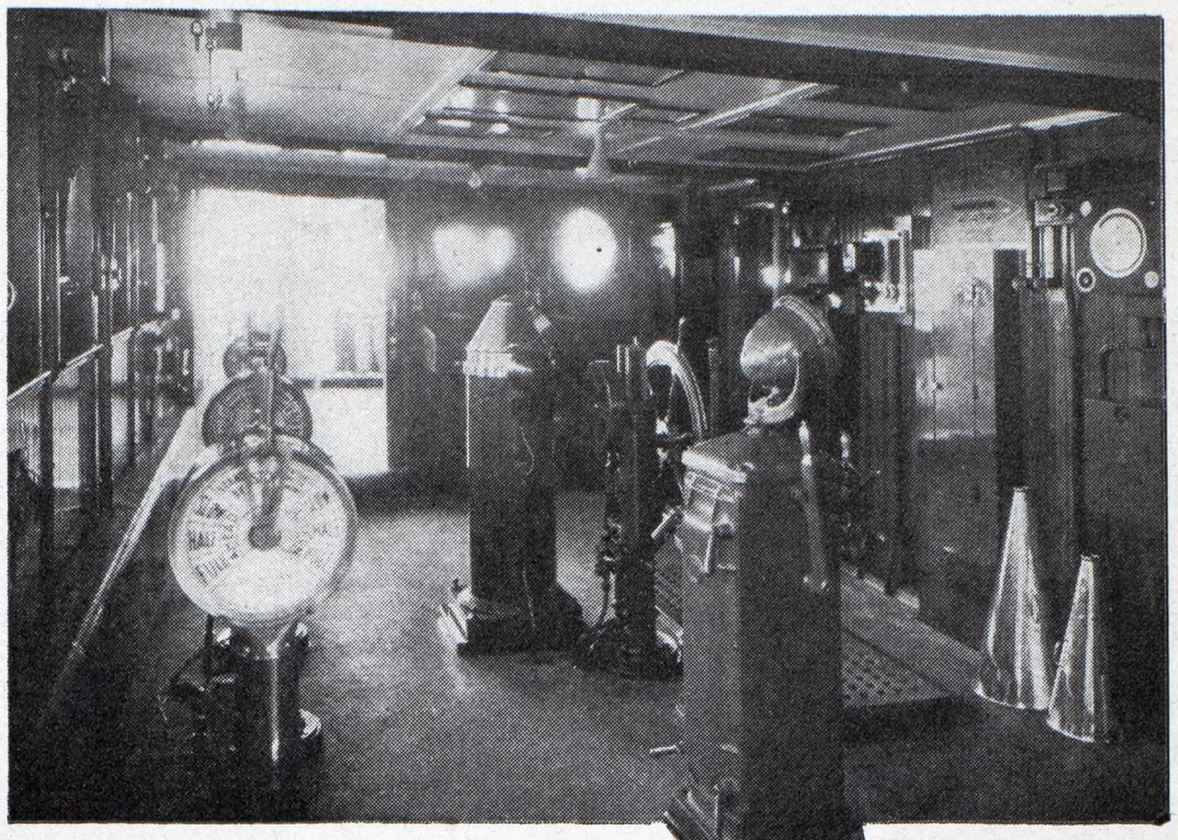
In the tier of houses on the sun deck is the children's playroom and the gymnasium for first class passengers. A large portion of the sun deck is available for deck games, about 3000 square feet, and is suitably

Morro Castle---Turbine Electric Liner

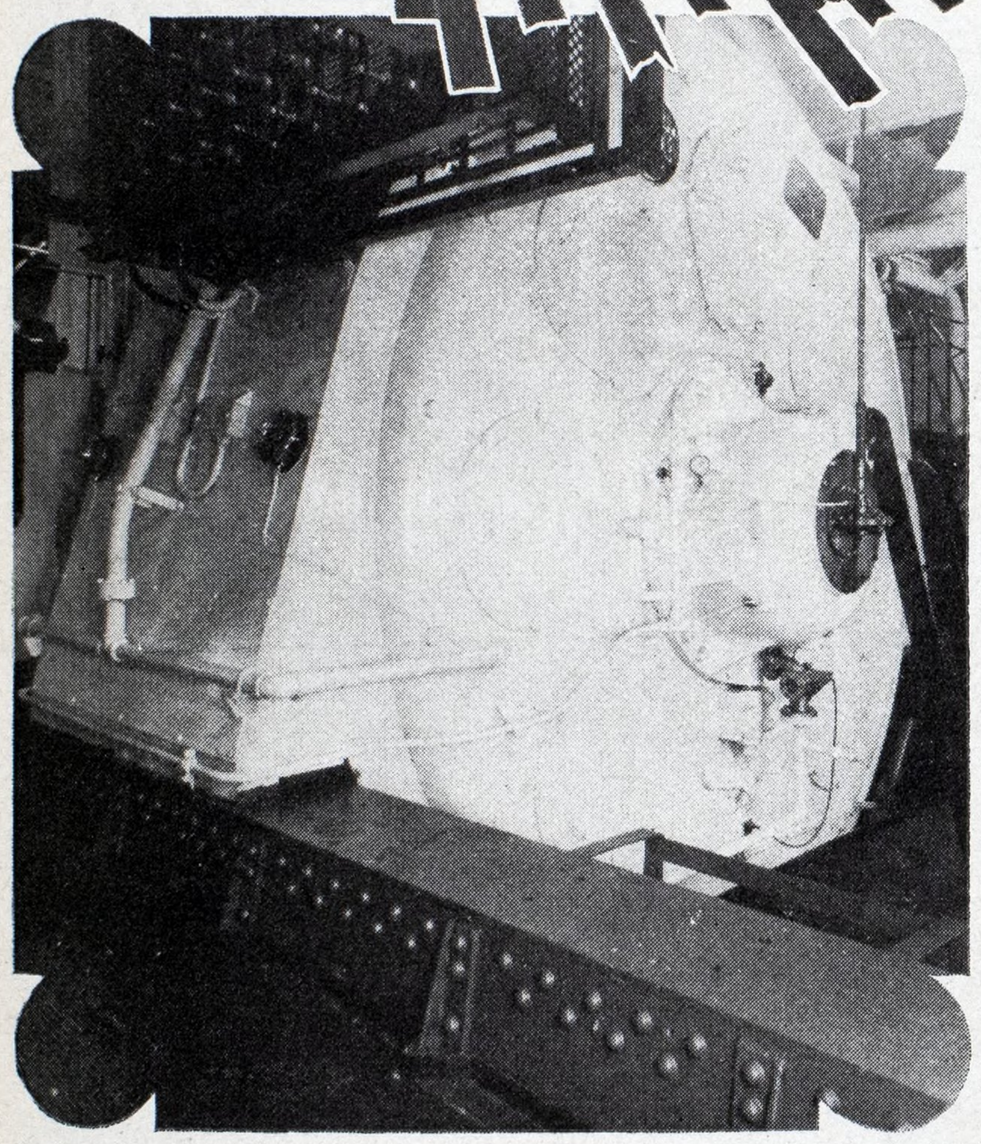


At Left—Inclosed Promenade-Cafe

Below—Wheelhouse on Bridge

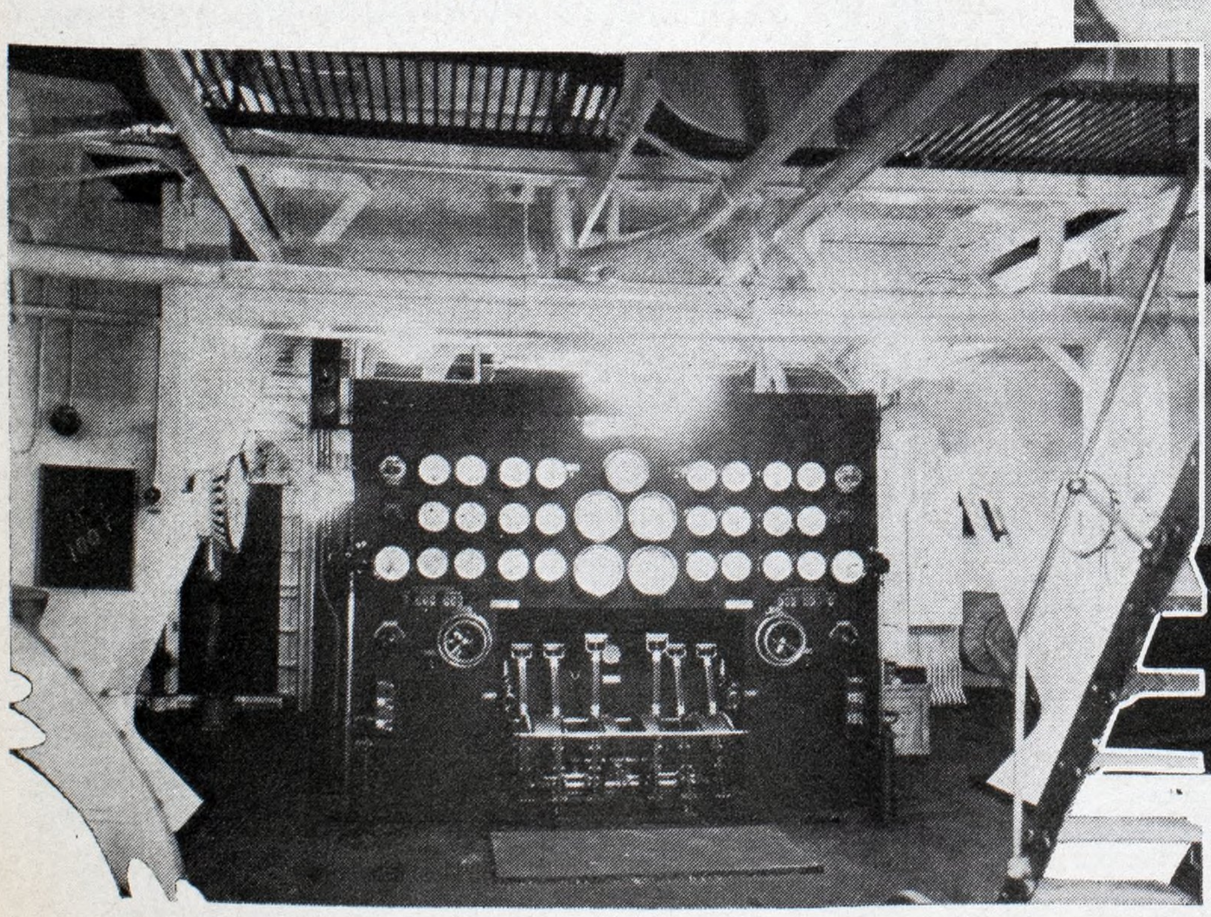


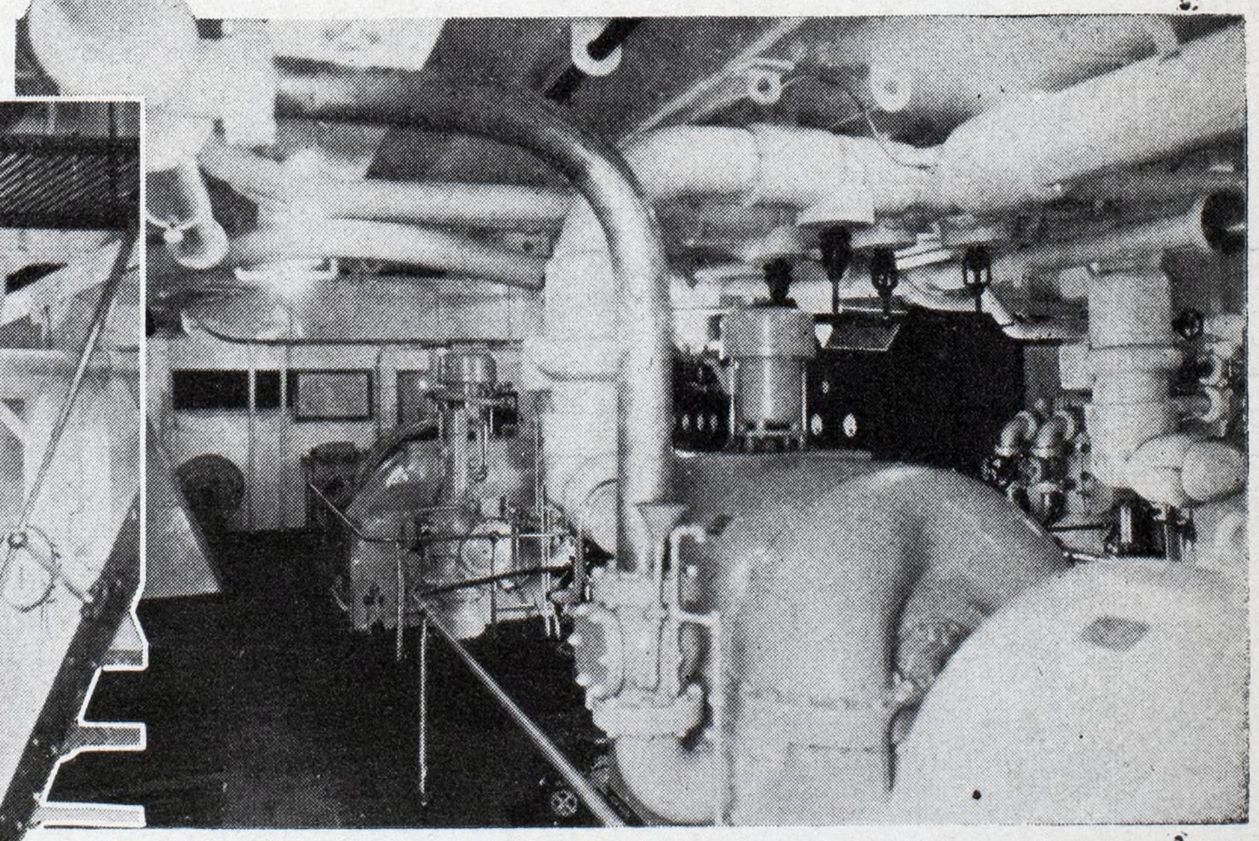
At Left—Main Propulsion Motor



Below—Propulsion Control Board

Above—Lounge First Class





Above—Generator Flat—Port Side

covered with painted awnings; also aft on the promenade deck is a large area covered by awnings. This may also be used for deck games.

In the forecastle head are the accommodations for sailors, watchmen, carpenters, boatswains, bedroom, stewards and waiters boatswain stores, ship gear, carpenter shop and crews hospital. Amidship on upper deck are the accommodations for stewards, engineers and crews departments, firemen, oilers, watertenders, messroom dry linen, clean linen stowage, and baggage stowage. On the main deck level amidship will be the main turbo-generator flat, auxiliary generator flat, refrigerator machinery, fomite room, engineers workshop and stores, electrical workshop and stores, stewards bulk stores, and empties. Forward on this deck are fans, cooling coils, cooling chambers for air-cooled refrigeration and aft are more fans, and brine spray tank for air cooled refrigeration.

Galley and Refrigerated Spaces

The main galley and pantry and mess spaces are located just aft of the dining saloon and is entirely enclosed in steel. The distinctive feature of this galley is that there are partitions in it separating the various mess spaces from it, except the bake shop which is also entirely enclosed by steel bulkheads.

The other spaces such as dish scullery, glass and silver scullery, service room, kettles, etc. room, galley scullery, vegetable space, coffee and cold pantry and beverage room, are separated from the galley only by dressers with zinc covered tops. This makes a splendid light and airy galley. The dining room service enter the galley on the port side, travel aft and across the ship and then forward entering the dining saloon on the starboard side. With this arrangement when coming from the dining room they come first to the sculleries where they deposit soiled dishes, etc., then across the ship through the pantry space passing beside a 16-foot steam table then between the cold pantry and the beverage room, and back to the dining room. The galley, etc. are tiled with 6 x 6-inch rough red quarry tile.

The refrigerator spaces of the Morro Castle are remarkably large and commodious, consisting of the following approximate cubics:

About 54,000 cubic feet of air cooled cargo space forward divided into three separate compartments, namely 'tween decks, lower 'tween decks and hold. About 28,500 cubic feet of air cooled insulated space aft in No. 4 'tween decks. This space is cooled by a specially constructed brine spray cooler for handling fruit or vegetables which have been or have not been precooled. About 35,000 cubic feet of low temperature refrigerated spaces aft, which is piped with brine coils for low temperature cargo. This space is divided into the following spaces:

On No. 4 main 'tween deck there are two spaces of about 3000 cubic feet each for beef or tobacco. On No. 4 main 'tween deck there are two spaces, one of about 9700 cubic feet, and the other about 15,300 cubic feet. In the No. 4 lower hold, between the shaft tunnel there is a meat or vegetable compartment of about 4500 cubic feet.

The steward stores has about 7200 cubic feet of refrigerated space consisting of meat, fish, fruit, vegetable and dairy products the miscellaneous galley pantry, wine room, and beverage room, etc., are refrigerated with individual refrigerators of General Electric make, while the main system is supplied by Brunswick-Kroeschell.

The air cooling systems for carrying air-cooled cargo will be of two different types. For the air-cooled cargo forward in the No. 3 main 'tween decks, lower 'tween decks and lower hold, it will be on the closed circuit system, consisting of coil room fitted with coils, two fans and the necessary air ducts as usual. The air-cooling system of No. 4 main 'tween decks is of the brine spray system, consisting of brine spray tank, two fans and necessary air ducts. The total capacity of the above system is about 85,000 cubic feet. The air cooled cargo in No. 3 main 'tween decks is about 57,000 cubic feet. When the cargo is delivered on board for the forward air cooled spaces at a temperature not exceeding 80 to 85 degrees Fahr. and the atmospheric temperature does not exceed 90 degrees Fahr. and the temperature of the sea water does not exceed 85 degrees Fahr., this air-cooling system is capable of lowering the temperature in the compartments 25 degrees when landing in New York, it being understood that the closest port to New York will be Havana, Cuba.

All cork board is of pure sheet cork, without cork binder, all insulating paper is two ply. All granulated cork used was blown in and packed to a density of 8 pounds per cubic feet. All cow hair is of such quality as will pack firmly at about 17 pounds per cubic feet, the sheathing and studding is of cypress.

Heating, Ventilating and Plumbing

Direct radiation is absent in the passenger accommodations. The air comes by ducts to the various staterooms and public spaces from fans at a central location where it has been heated or cooled, as the temperature of the sea air may require.

Fresh hot and cold water is piped to wash basins in all staterooms and to tubs and showers in toilets and baths. All bathtubs in public and private baths (but not including the shower over same) are piped up so that hot fresh water can be used to heat the cold salt water, thereby providing a hot salt bath. Care has been exercised to prevent the possibility of salt water getting into the fresh water.

Sperry navigating equipment has been installed consisting of a gyro compass, gyro pilot, 18-inch searchlight and a course recorder which records and gives continues indication of ship's bearings. The gyro pilot control unit is located in the wheel house and is arranged either to hold the ship's head automatically to the set course by means of a contact maker electrically driven from the master gyro compass or to permit electric hand steering through small steering wheels. In either case it functions in connection with the after electrical power unit. The gyro pilot power unit is located in the steering engine room.

Main Propelling Machinery

These vessels are equipped with twin screw electric propelling machinery consisting of two main turbine generators, two main propelling motors, and three auxiliary turbine generators, (including light and power plant). The engine room auxiliaries are partially electric and partially steam driven. There are two main propulsion motors.

The two marine type General Electric steam turbines each have maximum continuous ratings of 8000 propeller shaft horsepower at 3168 revolutions per minute which corresponds to 144 propeller revolutions per minute. Steam conditions at main turbine throttles will be 275-pound gage, 200 degrees Fahr. superheat. These turbines will exhaust into condensers capable of maintaining a 28.25-inch vacuum in the turbine exhaust casing, with 70 degrees Fahr. sea water and 30-inch barometer.

There are two alternating current generators, direct connected above turbine, each having a maximum continuous rating of 6100 kilowatts, corresponding to 8000 shaft horsepower delivered to propellers, 3168 revolutions per minute, 3150 volts, unity power factor, three phase, torque margin in combination with motor characteristics approximately 40 per cent. There are two surface air coolers for main propulsion generators, designed to maintain a temperature of ventilating air, leaving the coolers at maximum rated load of not more than 40 degrees centrigrade with 85 degrees Fahr. ingoing water. There are two main motors furnished by General Electric of the synchronous induction type, each rated 8000 shaft horsepower maximum continuous output 144 revolutions per minute, 3150 volts, 3 phase, unity power factor and torque margin in combination with generator characteristics 40 per cent.

Propulsion control equipment consists of one main operating panel with main high voltage control group for field circuits, with all ncessary resistors and accessories. There are two

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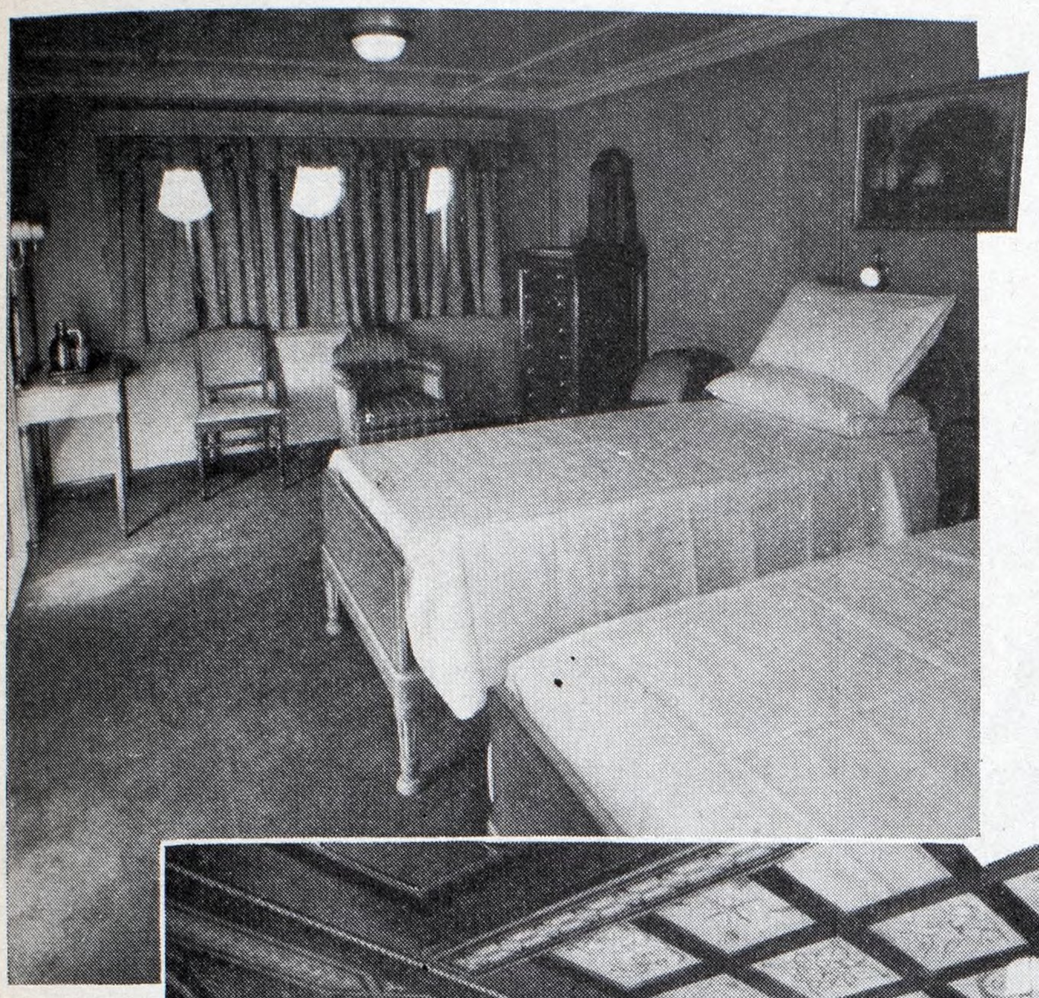
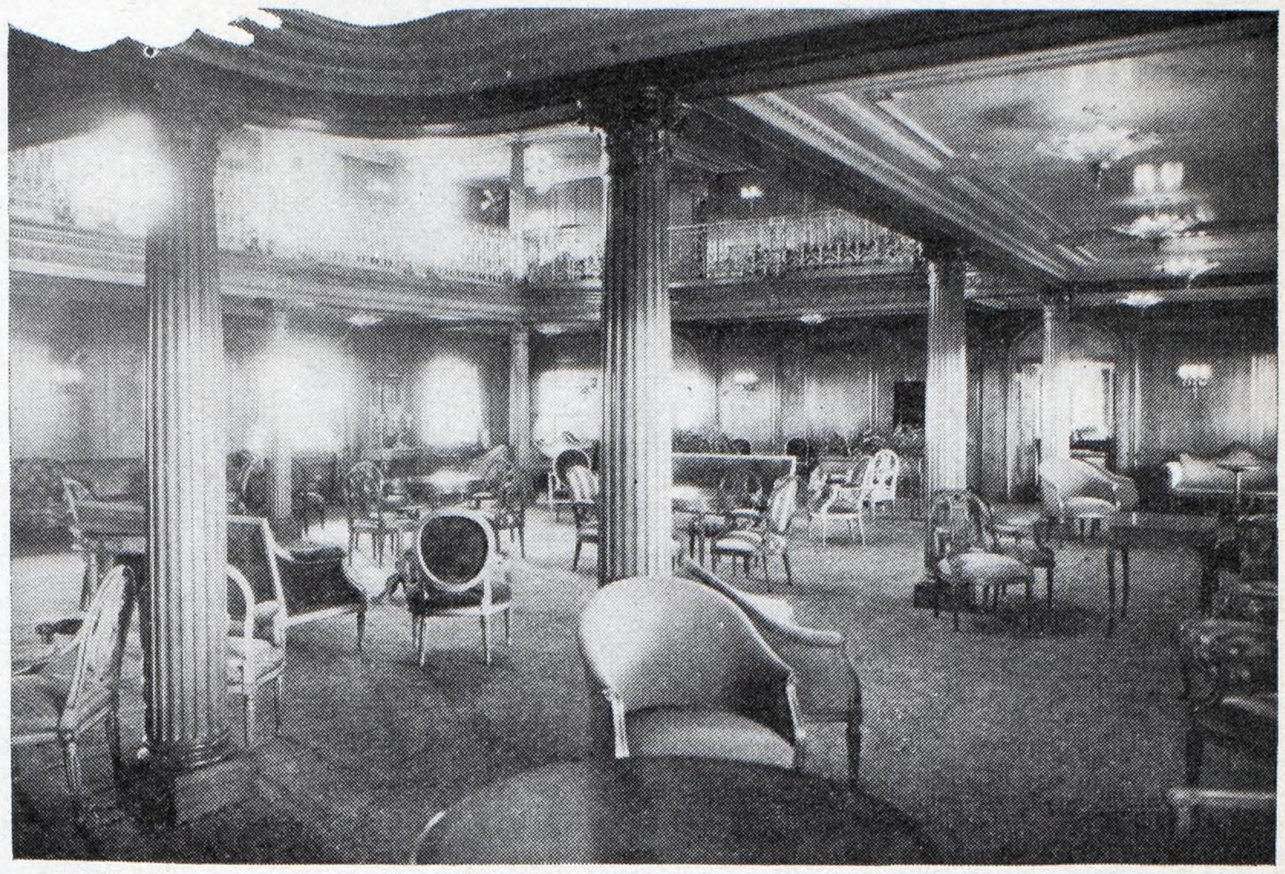
Passenger Spaces on S. S. Morro Castle

Below—One of the Suites De Luxe

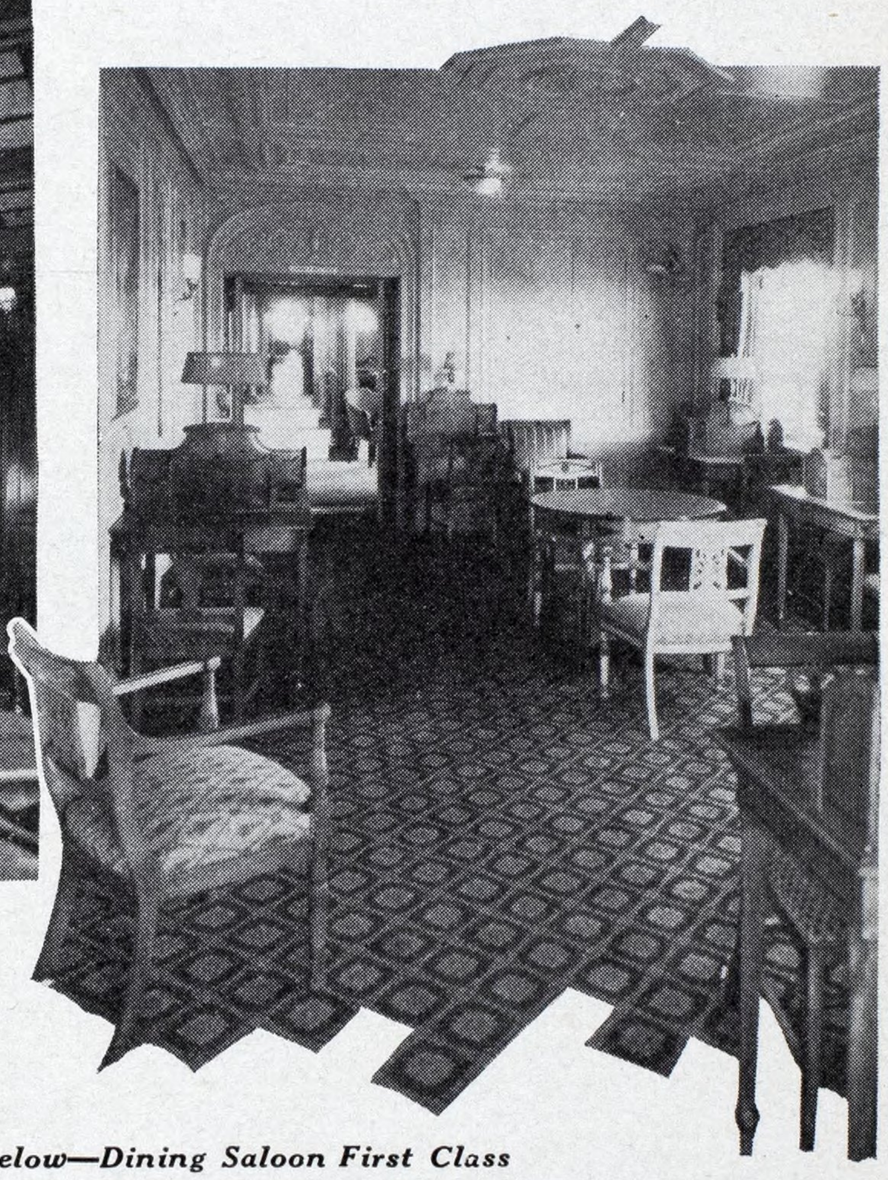




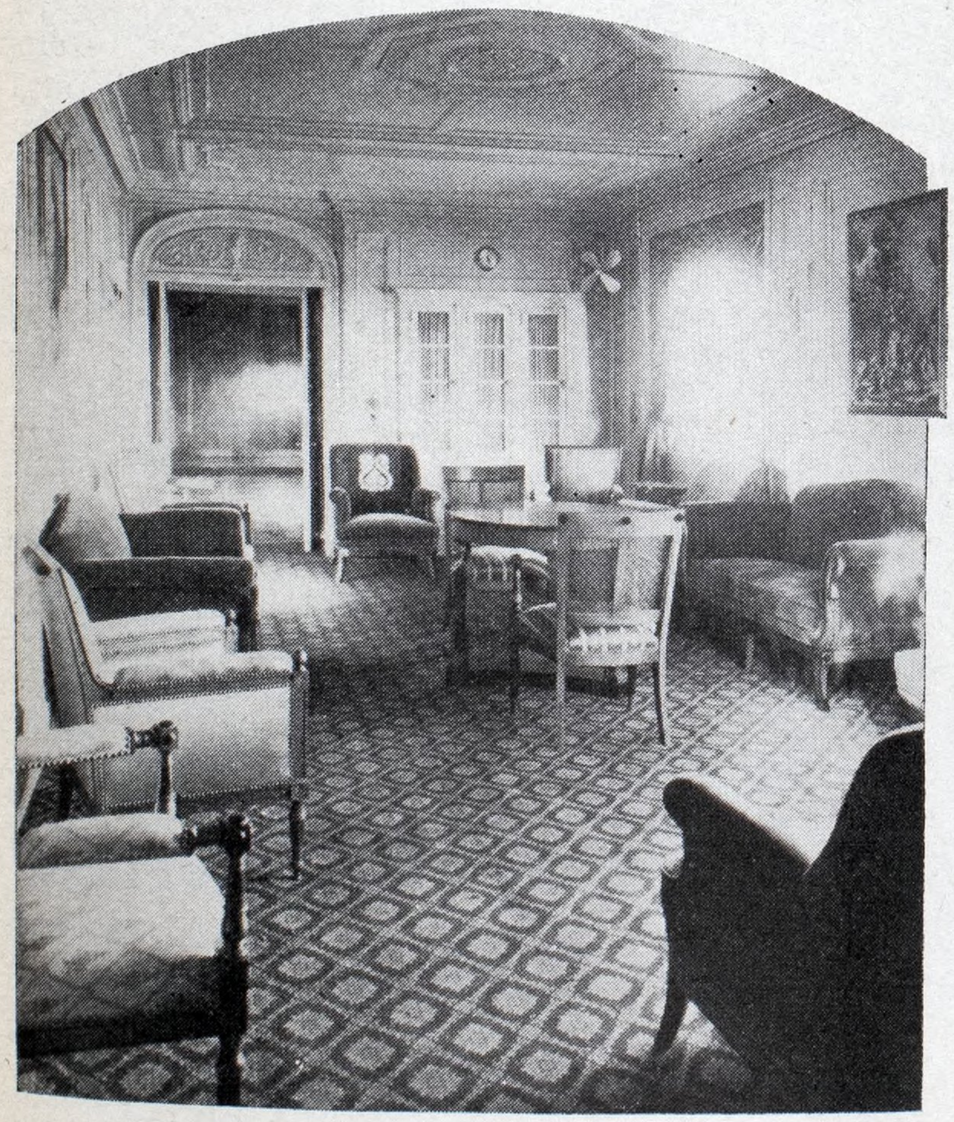
Above—Lounge First Class

Below—Writing Room

Above—Smoking Room First Class



Below—Dining Saloon First Class



Above—Library First Class

S. S. EXCALIBUR

Launched at Camden

Sponsored by Mrs. Hoover

First of Four Combination Passenger and Cargo Liners for Export Steamship Corp. — To Run Between North Atlantic, Mediterranean and Black Sea Ports

Launching Party Headed by the First Lady of the Land, Mrs. Herbert Clark Hoover, as Sponsor

THE S. S. EXCALIBUR, first of four combination passenger and cargo liners, (six are called for in the program, with another two optional, but so far contracts have been let for only four) was launched at the yard of the New York Shipbuilding Co., Camden, N. J., Aug. 5. The ceremony was of unusual interest because of the distinguished sponsor. Launching of a ship always has something of the dramatic about it which was particularly well expressed by Mrs. Hoover in her little speech at the luncheon when she said, "I got a real thrill when I put my hand on the bow of the EXCALIBUR and felt her moving and really starting off. This will be an experience to remember all my life." During the long useful anticipated life of the EXCALIBUR may this be an omen of good luck.

The launching took place at 12:07 p. m. as the sponsor crashed a bottle of water on the prow of the ship. A luncheon followed at the Walt Whitman hotel, Camden, N. J. Mrs. Hoover was the guest of honor and about 250 persons were present as guests of the New York Shipbuilding Co., among these were Senator David E. Baird, of New Jersey, T. V. O'Connor, chairman of the shipping board, Rear Admiral Bostwick of the Philadelphia navy yard and W. Irving Glover, first assistant postmaster general.

A diamond pin was presented to Mrs. Hoover, and in offering this gift to the sponsor and guest of honor, Clinton L. Bardo, president of the shipbuilding company, called attention to the fact that this was only the third time in the history of the country the wife of a president had christened a merchant ship. "The first time," said Mr. Bardo, "was when Mrs. Grover Cleveland launched the ST. PAUL from Cramp's shipyard, the second time was twelve years ago when Mrs. Woodrow Wilson launched the first ship, the QUISTCONCK, built at Hog island."

Speeches by Chairman O'Connor, first Assistant Postmaster General Glover, John Q. Tilson, Republican leader of congress and Mr. Clinton L. Bardo, all emphasized the significance of this event to the American merchant marine. This launching does represent the fulfillment of years of unremittent hard labor on the part of Henry Herbermann, president of the owning company, and those associated with him. Eleven years ago his company took over the management for the shipping board of a fleet of 19 of the famous Hog island type of freighter. For six years the Export Steamship Corp. continued the shipping

> IT isn't the size, nor the speed, nor the great luxury; nor any other feature of elaborateness which makes the launching of the S. S. Excalibur an event of importance in marine circles. It is of great importance because it is the first definite step in the fulfillment of a plan to build up the American merchant marine by encouraging private enterprise. When this law was passed many were skeptical about its usefulness. The launching of this vessel adds more tangible proof to the effectiveness of the merchant marine act of 1928.

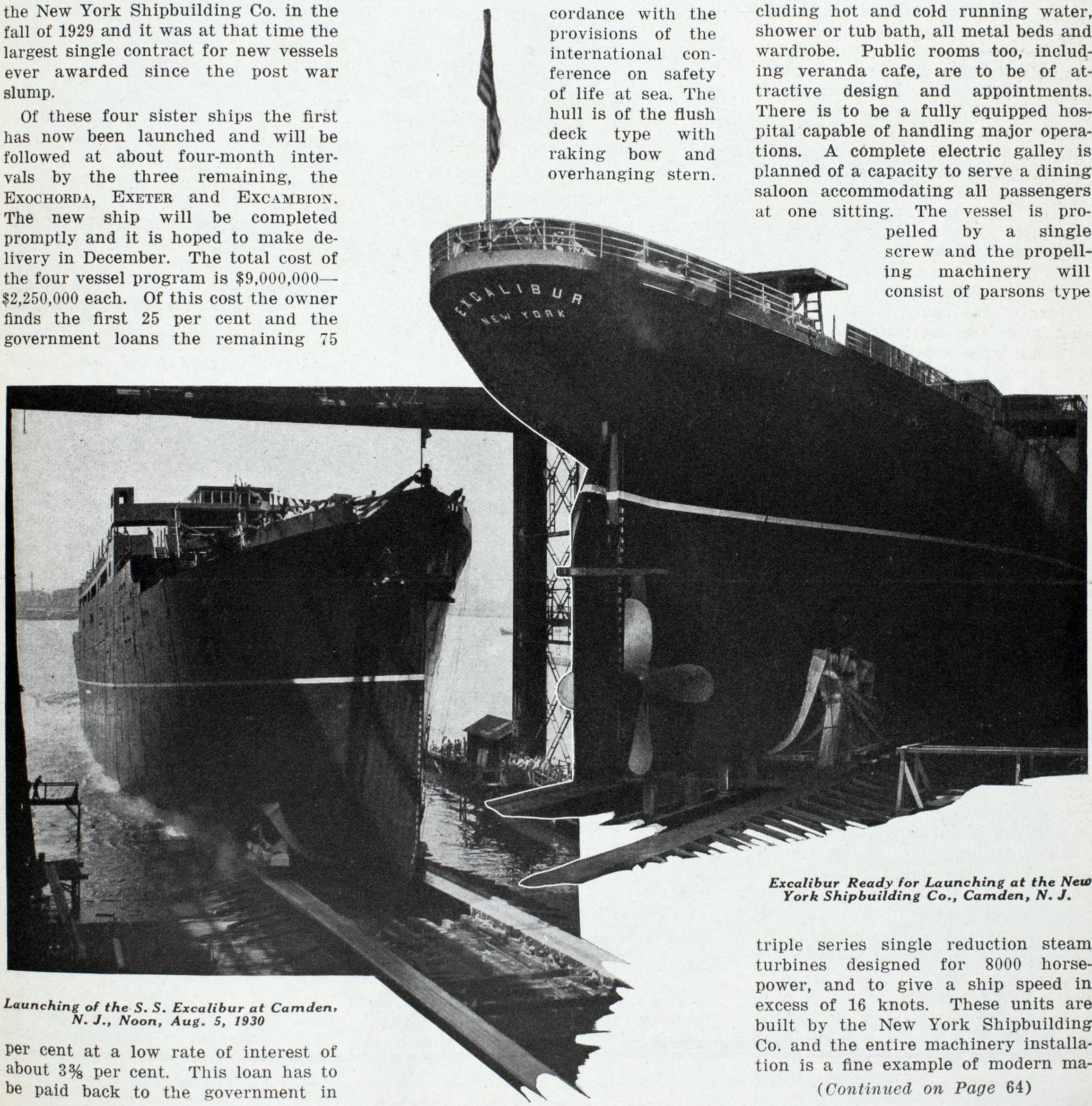
board services from North Atlantic ports to the Mediterranean and Black sea ports. Five years ago the Export Steamship Corp. bought this fleet and services from the shipping board. Later five additional vessels were purchased and 15 others chartered from the shipping board to handle growing traffic. For five years this company has operated successfully as one of the largest American owned steamship companies in the foreign trade.

In the meantime the Jones White act of 1928 became law providing for aid in the form of mail contracts and construction loans. This company was one of the first to be awarded mail contracts and a construction loan for new ships under the new law. By the terms of its contract with the post office department six new ships are to be provided in due course. Four of these ships were contracted for with the New York Shipbuilding Co. in the fall of 1929 and it was at that time the largest single contract for new vessels ever awarded since the post war slump.

Of these four sister ships the first has now been launched and will be followed at about four-month intervals by the three remaining, the EXOCHORDA, EXETER and EXCAMBION. The new ship will be completed promptly and it is hoped to make delivery in December. The total cost of the four vessel program is $9,000,000—$2,250,000 each. Of this cost the owner finds the first 25 per cent and the government loans the remaining 75 per cent at a low rate of interest of about 3⅜ per cent. This loan has to be paid back to the government in at least tweny yearly installments.

The new ships are of particularly pleasing design and should do much to make popular this now well established American service for passengers as well as cargo between American North Atlantic ports and Mediterranean and Black sea ports. It is a splendid beginning in meeting foreign competition by superior ships. For their class nothing now in this service or contemplated as far as we know by foreign lines will equal the new ships.

The EXCALIBUR is 475 feet in length overall; 61 feet, 6 inches in molded beam; 42 feet, 3 inches in depth molded to shelter deck and will have a gross tonnage of about 8700. When completed she will undoubtedly be one of the most modern combination passenger and cargo liners ever built in this country—fast, comfortable and constructed in accordance with the provisions of the international conference on safety of life at sea. The hull is of the flush deck type with raking bow and overhanging stern.



Launching of the S. S. Excalibur at Camden, N. J., Noon, Aug. 5, 1930

Excalibur Ready for Launching at the New York Shipbuilding Co., Camden, N. J.

The design of the ship has been carried out by the New York naval architect, George G. Sharp, working in close cooperation with Henry E. Frick, vice president and general manager of the owning company. The experience of years of operation in this particular service has been carefully studied in the design of the new ships.

Cargo capacity will be approximately 6000 tons and refrigerated space of 34,000 cubic feet is provided for carrying perishable goods. The passenger accommodations are to be of the very finest type for a one class vessel and will provide room for 152 first class passengers. Arrangement of these accommodations is of a new character for ships built in this country and will be on what is known as the saw-tooth plan for making all staterooms outside rooms. The staterooms will be of attractive modern design and completely outfitted, including hot and cold running water, shower or tub bath, all metal beds and wardrobe. Public rooms too, including veranda cafe, are to be of attractive design and appointments. There is to be a fully equipped hospital capable of handling major operations. A complete electric galley is planned of a capacity to serve a dining saloon accommodating all passengers at one sitting. The vessel is propelled by a single screw and the propelling machinery will consist of parsons type triple series single reduction steam turbines designed for 8000 horsepower, and to give a ship speed in excess of 16 knots. These units are built by the New York Shipbuilding Co. and the entire machinery installation is a fine example of modern ma-

(*Continued on Page* 64)

Welland Canal Opening is Delayed

More Dredging Needed—Waiting for Safety Equipment—Could Lock Vessels Through—Will Open With Navigation in 1931

By A. H. Jansson

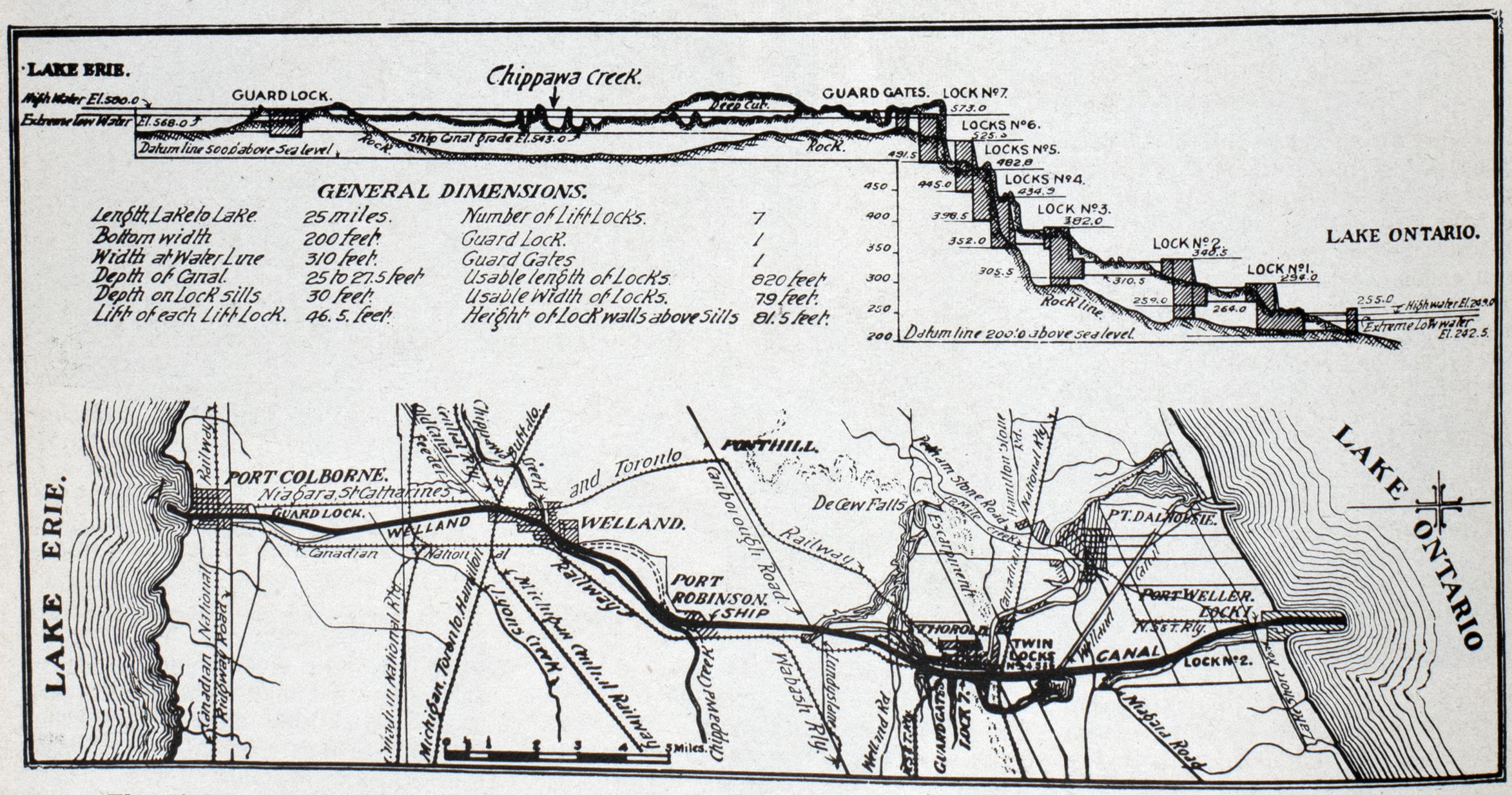
THIS article was intended to coincide as nearly as possible with the official opening of the new Welland ship canal which had been tentatively set for Sept. 1. When the writer visited the canal about the middle of July, except for a short stretch, by-passing the Thorold locks, the new canal was then in use from lake to lake. What appeared to be only a comparatively small amount of work remained to be done before operation could be carried on throughout its entire length. It was therefore rather a surprise to hear that postponement of the official opening of the new Welland ship canal, for use by upper lake freight vessels. until the spring of 1931, had been decided upon by R. J. Manion, Canadian minister of railways and canals. Since there is no pressing need to rush matters, it seems best to the authorities in this case to make haste slowly.

This delay is due to several factors. Unexpected difficulties in dredging portions of the summit level of the canal have been met; also to insure safety to large vessels transiting it is considered necessary to make certain of a 200-foot canal prism width at the bottom. Some delay has been experienced in delivery of a steel pontoon gate lifter of 500 tons capacity which is considered an essential safety measure. It is expected to be ready by the end of October. To prevent the collision of entering ships with the gates, steel cables are to be stretched across the locks at a sufficient distance from the gates. The installation of these snubbers has been found to be more of a job than anticipated and these fenders may not be entirely completed until late this fall or early winter.

On these counts the officials of the department have recommended the postponement of the opening ceremony until the beginning of navigation next spring. At that time the work will be so completely advanced as to give every assurance of free operation and complete safety to the large upper lake freighters. It is possible, however, that the new canal will be available for its entire length, during a part of the remainder of the present season, to the old canal size vessels. These vessels later on may also be allowed to load to more than the maximum 14 feet now permissible for transit.

The building of this canal can truly be said to be one of the outstanding engineering achievements of our time. Its proportions are majestic. The mighty twin locks Nos. 4, 5 and 6 at Thorold, one immediately following the other, or in one flight as it is

THIS great canal lies entirely within Canadian territory and was engineered, financed and built by Canada. What it will mean to water borne transportation on the Great Lakes is not yet fully appreciated. Traffic through the old Welland canal has been steadily increasing. Nearly, 7,500,000 tons were handled through the old canal in 1928. Thirty years ago the tonnage going through was only about half a million tons. But even the present large tonnage is but a small proportion of the tremendous traffic through the canals at Sault Ste. Marie between Lake Superior and Lake Huron, which for 1928 amounted to 86,993,000 tons, nearly 18,000,000 tons more than the combined tonnage through the Panama and the Suez canals.



Elevation and plan of New Welland Ship Canal—Usable length of locks 820 feet—Usable width of locks 79 feet

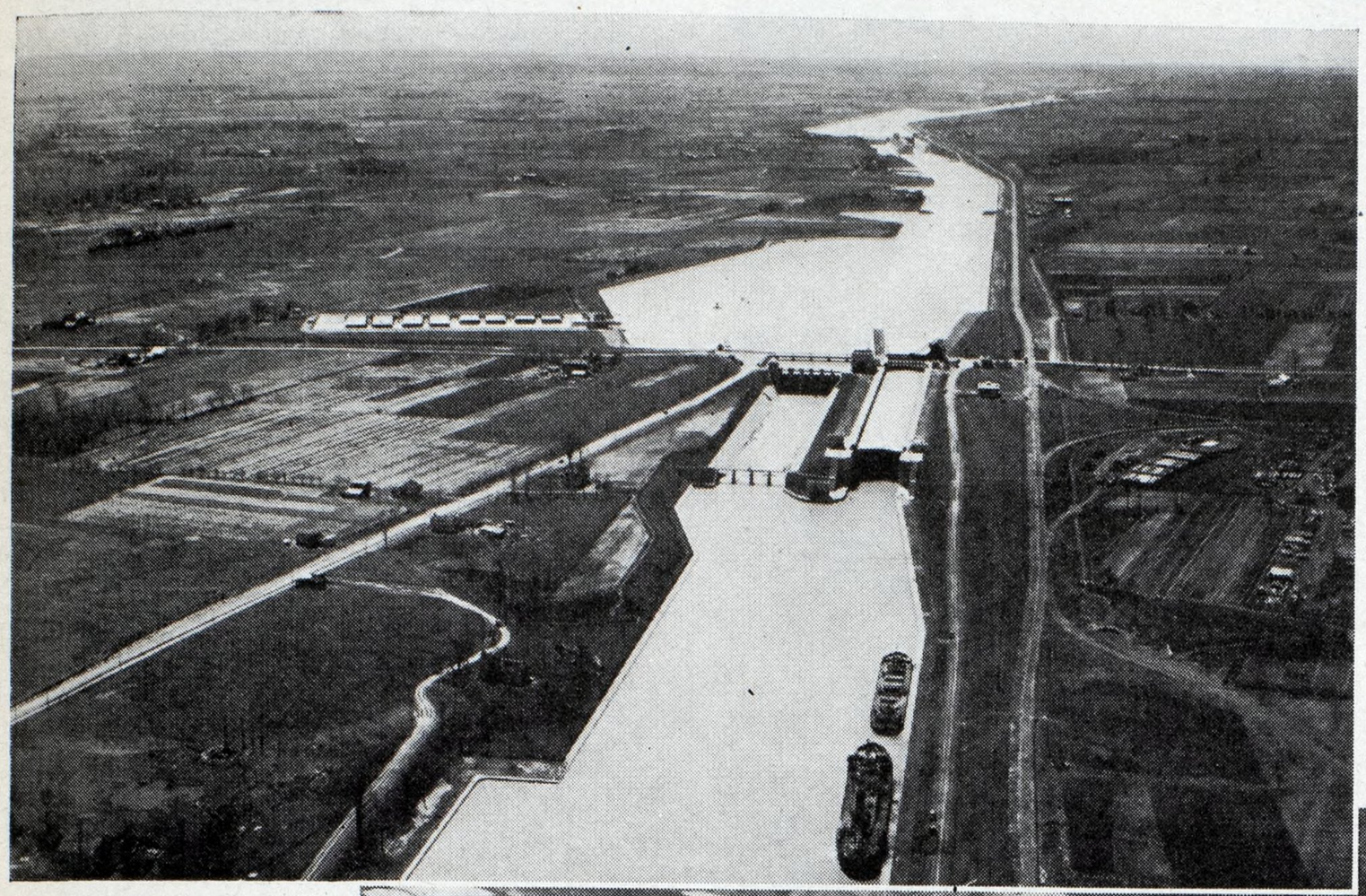
called, have the tremendous aggregate lift of 139½ feet. Looking down into the empty lock basin with the great steel gates in position the immensity of it is beyond description. These locks are similar to the Gatun locks on the Panama canal which though somewhat longer and wider, have only an aggregate lift of 85 feet. It means in fact an almost sheer climb from the lower level well toward that of Lake Erie. The great height is illustrated by the depth of the concrete wall at the north end of lock No. 5. It measures 130.8 feet from the coping of lock No. 5 to the bottom of lock No. 4. The horseshoe falls at Niagara are 158 feet high. In completing this great work Canada has again demonstrated to the world her engineering talent driving energy and vision in building a canal suitable, not only for the present, but for future generations. The first link has thus been completed in a seaway from the Atlantic to the Great Lakes.

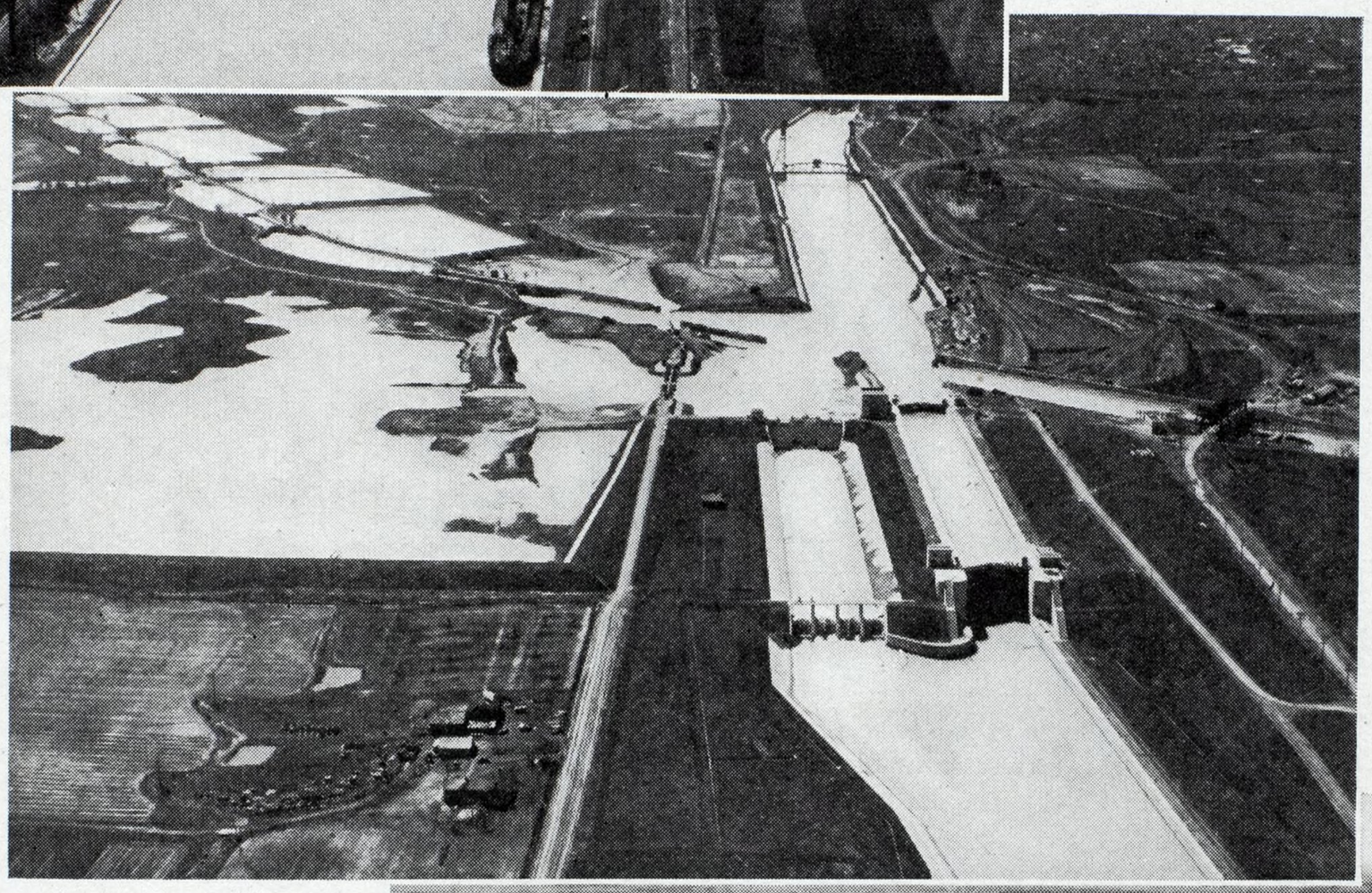
Its immediate effect will mean that great vessels such as the Canadian bulk cargo carrier LEMOYNE, 633 feet in length overall, 70 feet in breadth and 29 feet in depth, carrying 14,500 tons on a draft of 18 feet will be able to go from the upper lakes to any port on Lake Ontario. This will mean for instance that this one vessel can bring down in one cargo 518,000 bushels of wheat and can trans-ship this to canal or rail just so much nearer destination.

In MARINE REVIEW for January, 1929 there appeared a progress article on the new Welland canal. In that article a brief history was given of the three previous canals across this peninsula, the first one being completed just a little over 100 years ago. This first canal had 40 wooden locks, each 110 feet long, 22 feet wide with an 8-foot depth of water on the sills. The new canal now about to be opened has a total length of 25 miles or 27.7 miles between the outermost ends of the harbors of Port Weller on Lake Ontario and Port Colborne on Lake Erie. In the open stretches it has a width of 310 feet on the surface and 200 feet at the bottom. It has a useful length of locks of 820 feet and a useful width of 79 feet. The depth of water over the sills is 30 feet and the navigable depth minimum to begin with is 25 feet.

For all practical purposes of navigation the new canal is a straight line from beginning to end. The difference between the levels of the two lakes (326½ feet) is compensated for by seven locks of 46½ feet lift each, and one controlling lock. In addition to its much greater capacity the time of transit has been cut to less than half. Under favorable conditions it might take from 16 to 18 hours, to transit the old canal which had 25 locks, while the new canal with its 7 locks can be transited under normal conditions in approximately 8 hours. A vessel can be locked through one of the locks from the time of its approach until it is clear in about 22 minutes.

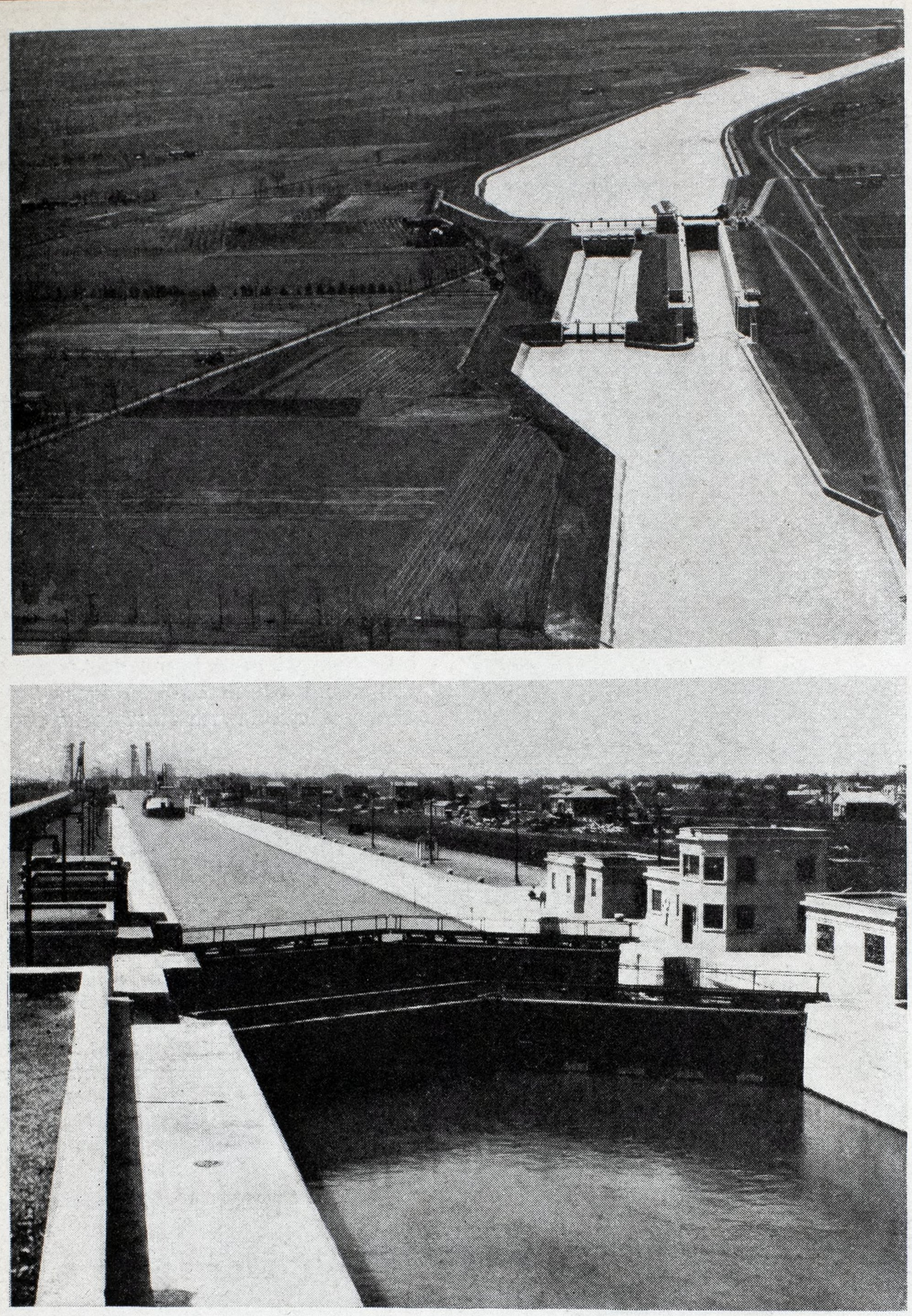
The route of the canal and the lift

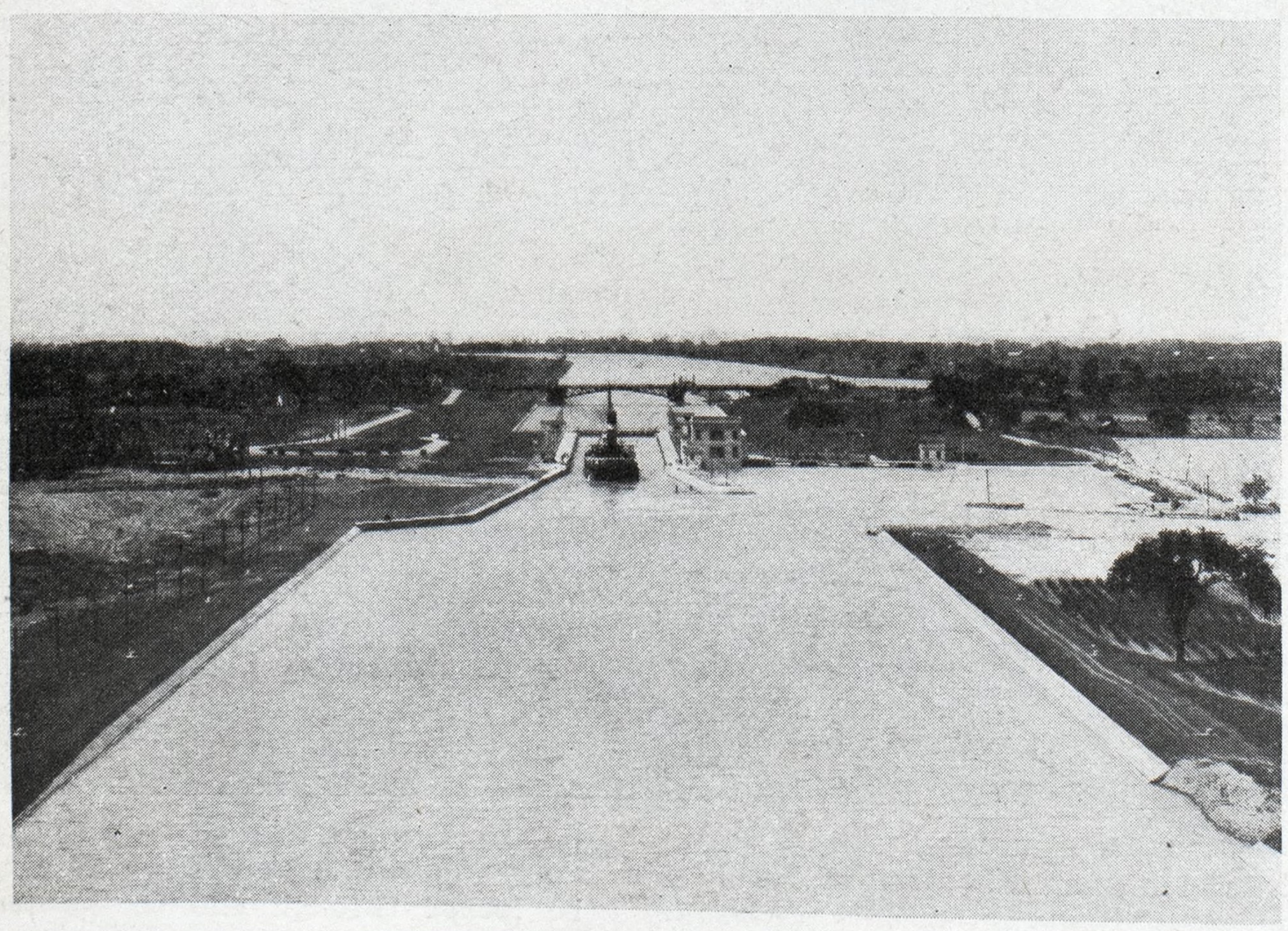




Aerial Views of the New Welland Ship Canal taken by the Canadian Royal Air force. Above—Lock No. 1 at Port Weller, Ont. At Right—Lock No. 3—Bridge 5 and Old Welland Canal Crossing

Below — Looking down on the twin locks in flight—Nos. 4-5 and 6—Raising a vessel a total of 139½ feet—This is one of the outstanding engineering feats of the Canal





New Welland Ship Canal. Upper—Lock No. 2 Port Weller. Middle—Lock No. 8 Looking South, June 9. Lower—Looking North from Bridge No. 5 July 3

of the locks are indicated in the accompanying diagram. Lock No. 1 is located but a short distance in from the Lake Ontario shore at Port Weller. The head of this lock is crossed by a single leaf rolling type lift bridge. Not far from lock No. 1 off the approach basin has been constructed a huge graving dock intended primarily as a stowage and repair plant for the tremendous steel lock gates which are floated in. The water is emptied by gravity into the lower level of the canal below lock No. 1.

The dock is also of course flooded by gravity. As will be noticed on the diagram in elevation locks Nos. 2 and 3 are located some distance apart. Then comes the twin flight locks Nos. 4, 5 and 6 already referred to. The main line of the Canadian national railway from Niagara Falls to Hamilton, Ont. crosses the foot of lock No. 4 over two rolling lift bridges. The flight locks are fed from a pond on the east side of the canal. This pond is formed by an embankment about 3500 feet in length with a maximum height of 80½ feet and covers an area of 84 acres. Lock No. 7 is located a short distance above the flight locks.

About a mile above lock No. 7 there is a guard gate and safety weir, as a measure of safety to hold back the water on the summit level should by any chance an accident occur to the gates on lock No. 7 or the flight locks

In the section between Port Robinson and Welland some of the most difficult engineering work on the canal was carried out in building a new channel for Chippawa creek. The next section of the canal, known as No. 7 traverses the country from Welland to Humberstone. Section No. 8 stretches from Humberstone to deep water in Lake Erie. In this section is located lock No. 8 for controlling the fluctuating level of Lake Erie and maintaining a constant canal summit level. It is the longest lock in the world, measuring 1380 feet between the inner gates. It is approached in size only by the two locks on the American side at Sault Ste. Marie, both being 1350 feet long. There is a breakwater extending over 2000 feet long into Lake Erie.

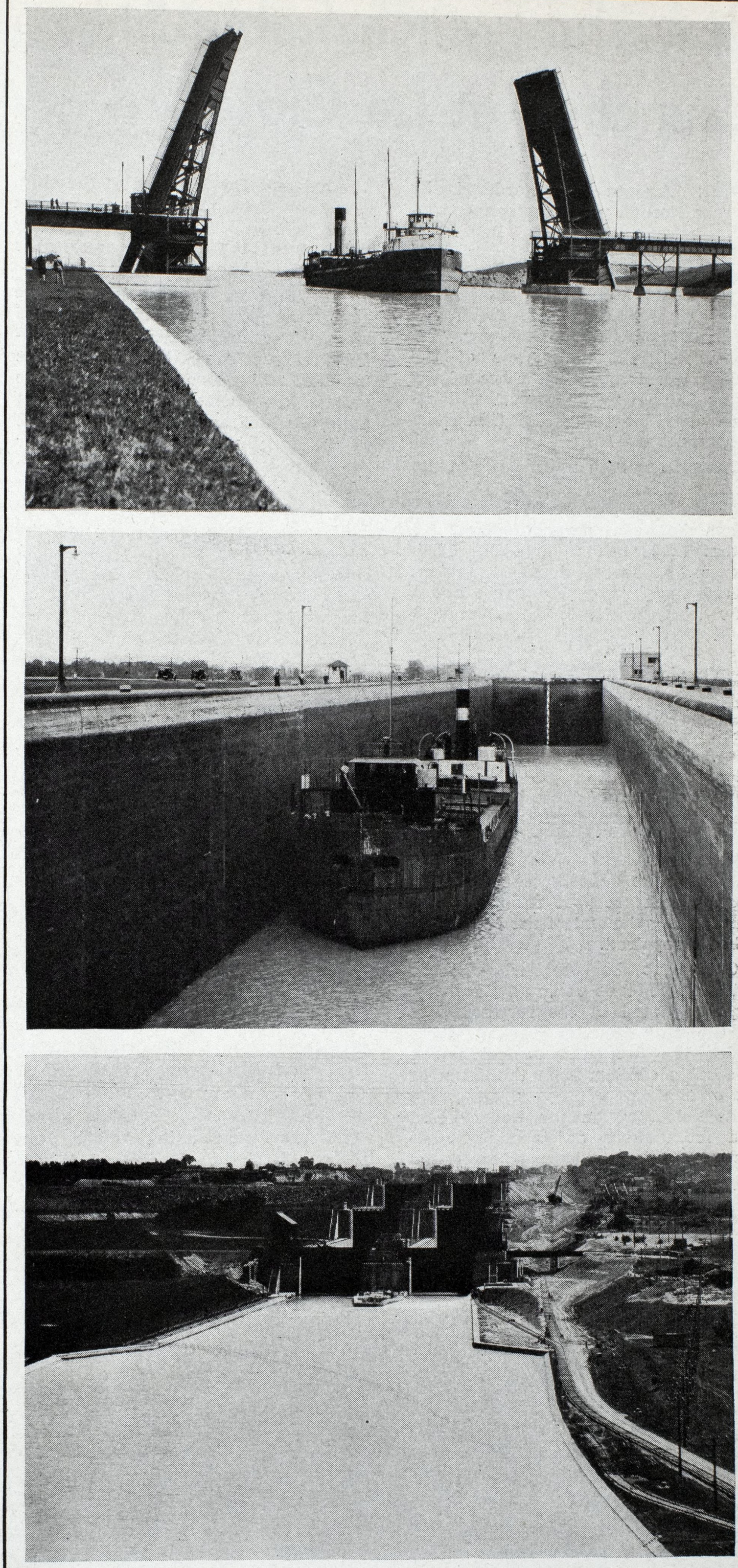
Work on this new canal has been going on for over 14 years and the number of men employed at one time has varied from 2700 to 3300. Some start at construction was made in 1913 but no work was done during three years of the war. It is estimated altogether that another two years will be necessary to complete all of the work, though this will not in any way interfere with traffic through the canal. Up to the time this is written, about $114,000,000 has been expended and the total cost to complete the canal in every detail, it is estimated will be $122,000,000.

The aesthetic, though it is partly supported by practical needs, has not been neglected. A fine impression is made by the landscaping which is be-

ing carried out along the canal right of way. When this program is completed in the thorough-going manner in which it has been started, it will make this canal a beautiful scenic section and a powerful attraction to the traveler. The shrubs and particularly the trees planted serve the very useful purpose of a windbreak. It would be impracticable to transit the canal in a high wind.

This proud engineering achievement has been accomplished by the people of Canada. During the course of construction all these years, a total of 108 men have lost their lives in connection with the project. The department of railways and canals of the federal government of Canada with A. E. Dubuc, chief engineer, has been in immediate charge of carrying out the work. The engineering personnel are Canadians and mainly educated in Canadian universities. The man more than any other single individual who has carried the responsibility is the engineer in charge, Alex J. Grant who has held this position since 1919. He has had a lifetime's experience in building canals in Canada and his latest work is the capstone of a career of distinction as an engineer. Others connected with the work are E. G. Cameron, principal assistant engineer, F. E. Sterns, designing engineer, Brodie Atkinson, bridge engineer, J. B. McAndrew, assistant to designing engineer. The four division engineers on the field staff are E. P. Johnson, E. P. Murphy, F. C. Jewett and C. A. West. A particularly comprehensive and well written article by W. A. Irwin, on the Welland ship canal appeared in the Canadian publication. *MacLean's Magazine* for July 1, 1930.

WITH the opening of the new Welland canal any part of lake traffic may pass into Lake Ontario as may be found more economical for its ultimate destination. The immediate importance of the new canal is confined of course to interlake transportation and from Lake to barge canal and rails. But its greatest significance is undoubtedly as the first and most important link in an ocean waterway from the great inland lakes of America to the sea; and that this will come no one with faith in the future of the two sister nations will deny.



New Welland Ship Canal. Upper—Bridge No. 4 Looking North May 3. Middle—Lock No. 3 Looking North July 2. Lower—Flight Locks Looking South, July 3

Powerful French Cable Ship Launched at La Ciotat

THE AMPERE was ordered by the French postal, telephone and telegraph ministry in June, 1929, the contract being awarded to Societe Provencale de Constructions Navales. This vessel is to replace the cable ship EMILE BAUDOT, which was built in England during the war. The dimensions and the power of the AMPERE are larger than those of the EMILE BAUDOT, which itself will replace an older vessel, LA CHARENTE, at Havre.

The principle characteristics of the AMPERE are as follows: overall length, 91.50 meters (300 feet); length between perpendiculars, 82 meters (269 feet); breadth, 12.50 meters (41 feet); depth, 8 meters (26.25 feet); gross tonnage, about 3900 tons; draft, 5.50 meters (18 feet).

Carries 800 Tons of Cable

This vessel will be able to transport 800 tons of cable, which will be placed in three large holds of from 8 to 9 meters (26.25 to 29.52 feet) diameter. Two of these holds are in the fore part of the ship and one aft. In front of the first cable storage hold is another spacious hold, in which will be kept the special large buoys which are used for fixing and maintaining the end of the cable that is being repaired.

Cables to be repaired will be hoisted by means of two twin steam engines placed in the forward part of the ship, on the second deck, under the first and second holds. The cable coming from the drum of these engines will pass on guide pulleys located on the upper deck, and from there on to a dynamometer, which will be used for registering the tension of the cable. At the extreme forward end of the ship, the cable will pass over large cast steel pulleys. The indicated power of each of these steam engines is about 150 horsepower.

At the back of the deck is the equipment for laying cable, which is simply four large pulleys with powerful brakes. The cable which it is intended to lay also passes over guide pulleys, dynamometers and cast steel pulleys, which are located at the end of the deck. All this equipment for repairing and laying cables was supplied by the Telegraph Construction & Maintenance Co., Ltd.

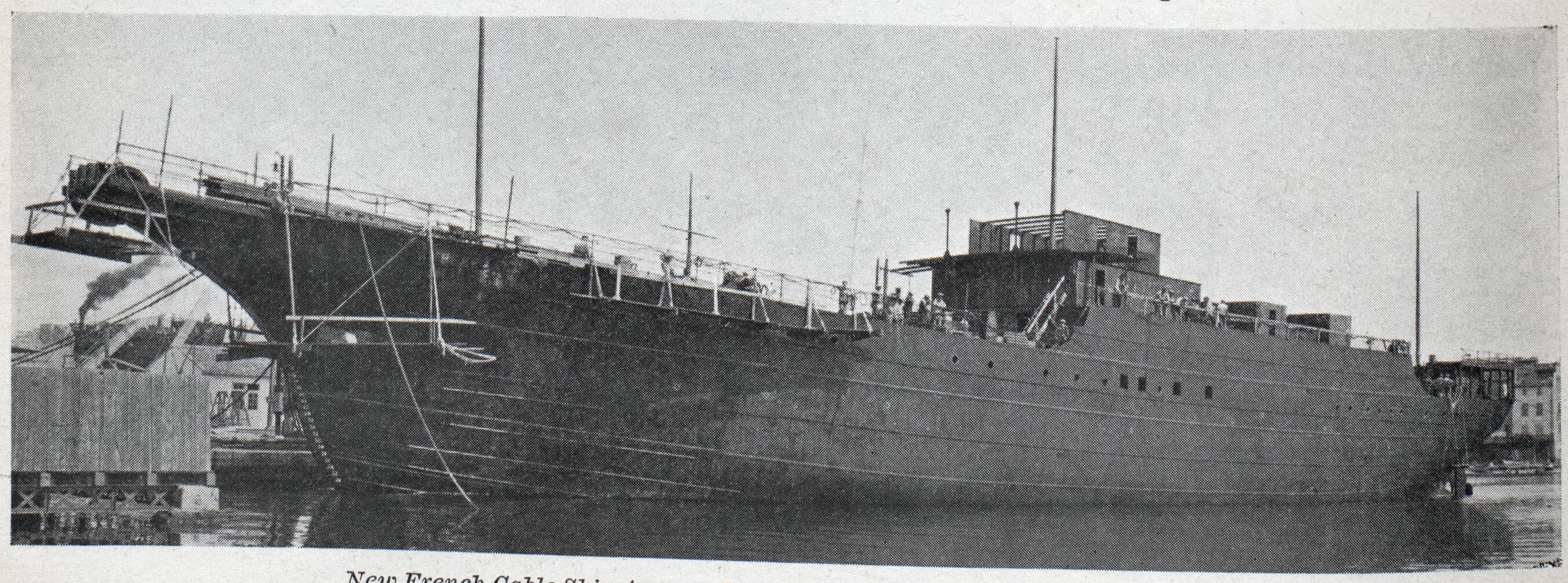
The propelling machinery of the AMPERE consists of two triple-expansion steam engines of 1200 horsepower each. These engines were built at the works of Societe Provencale de Constructions Navales, at La Ciotat. The cylinders of these engines have diameters of $17\frac{5}{16}$ x $27\frac{3}{16}$ x $45\frac{5}{8}$ inches, and the piston stroke is $28\frac{3}{4}$ inches for the three cylinders. The maximum power is developed at about 120 revolutions per minute. The distribution valves are of the cylindrical type for the high-pressure cylinder, the Andrew Cameron type at the intermediary cylinder, and the straight type for the low pressure cylinder. The link motion is of the Stephenson type. The speed reduction gears are of the Brown type. The steam is supplied to the two engines by three cylindrical boilers with return of flame and accelerated circulation of the Prodhon Capus type. The diameter of these boilers is 4.80 meters (15.75 feet), and the length is 4.60 meters (15 feet). They were built at the works of Societe des Chantiers Navals et Chaudronneries du Midi at Marseille. A slight pre-heating of the steam has been provided for. The fuel used will be coal, with the Howden system of forced draft. The coal holds will be able to take 700 tons each.

The auxiliary machinery comprises the following: Two independent feed pumps and two independent air pumps of the Weir type; two circulation pumps driven by steam engines and with pressure lubrication, entirely built by Societe Provencale de Constructions Navales, at La Ciotat; two 80-ton ballast pumps of the Hall type; two 10-ton pumps of salt water and fresh water, actuated by an electric motor of the Reteau type; two 6-ton evaporators; one reheating apparatus for fresh water; and atmospheric condenser of the Contraflo system; two electric generating sets of 40 kilowatts each of the Schneider-Larbodiere type; two CO_2 ice machines of the Hall type, of which one alone will be capable of maintaining a low temperature in the cold storage rooms.

Modern Navigating Equipment

In addition, the AMPERE will be equipped with the most modern apparatus necessary for working the cables and for controlling the ship, among the principal being: One wireless set with a radius of 2000 miles and another with a radius of 500 miles, one gyroscopic compass, one telescope, one depth finding apparatus of the Langevin Florisson type, another depth finding apparatus of the Marti type; and one electric depth finding apparatus of the Lucas type, with Brotherhood engine. The ship contains a laboratory with measuring instruments and control equipment specially designed for submarine cables. The living quarters also have been given a considerable amount of attention for the welfare of the staff and workers.

It is expected that the vessel will have a speed of 12.5 knots on trial, when fully equipped. The shell of the vessel at the time of her launch weighed about 1100 metric tons. The final trials at sea will be carried out at the end of the year if present plans for completing the vessel go through.



New French Cable Ship Ampere Launched at La Ciotat, France, May 18, 1930

What Pumps to Use for Heavy Oils

Selection, Installation and Care of Pumping Equipment for Handling Oils — Particular Reference to Use at Ports and Terminals

Part I

By H. L. Kauffman

WITH the growing use of oil as fuel on ships, it is becoming a matter of utmost importance that ports be fitted with efficient pumping equipment for handling the oil in a minimum of time. Another tendency in materials handling is for the transportation of liquid products in bulk, rather than in barrels or drums as was formerly so much the case.

All of which makes it evident that the equipment in use at ports and terminals for handling liquid products in bulk must be properly selected, installed and taken care of, if operations are to proceed with a maximum of effectiveness and at a minimum handling expense. What you should know about the selection, installation and care of pumping equipment for handling "heavy" oils and similar liquid products at ports, etc., will be discussed in the present article from the viewpoint of the engineer who has to design such a lay-out and of the superintendent who thereafter is responsible for its operation.

Although much of the information to be given herein will relate to the handling of all classes of liquid products, particular emphasis will be placed upon the selection and use of pumps for handling "heavy" oils (fuel oil, lubricating oil and similar viscous products).

The pumping of fuel oil, lubricating oils and other refined petroleum products such as gasoline, naphtha, kerosene and the like, presents more difficult problems than are encountered in the pumping of water. Fuel oils and lubricating oils, for example, are often of such high viscosity and are so thick and sluggish that they require preheating to lower their viscosity and to render them sufficiently fluid so that they will flow readily; and even though so-called "light" oils are as fluid as water, they are more difficult to handle than water.

For one thing, the total absence of lubricating qualities in gasoline creates a serious problem in packing liquid pistons and piston-rod or shaft stuffing boxes. Then too, the tendency of kerosene and oils of similar nature to seep through the most minute openings must be taken into consideration and adequate provision made to eliminate such leaking tendencies. The fact that naphtha has a solvent action on cast iron and tends to soften the metal, thereby causing a weakness in pump castings, makes it of utmost importance that the metal used in the liquid end of a pump be given careful consideration.

This article, in two parts, was prepared exclusively for MARINE REVIEW. The second part will appear in the next issue.

How to Select Your Pumps

In selecting the size and type of pump for handling heavy oils, a careful analysis should be made of all the factors relating to the installation. Very often a pump is installed that will do the work but which, nevertheless, is not the best type of pump for that particular job. The following factors are involved in selecting a pump:

1. Maximum amount of liquid the pump is ever likely to be called upon to deliver.
2. Viscosity and density of the oil.
3. Temperature of the oil, that is, whether hot or cold.
4. The condition of the liquid; in other words, whether or not it contains dirt or grit and, if so, is this foreign matter abrasive or not?
5. Maximum discharge pressure against which the pump must work.
6. Maximum suction lift or maximum suction head.
7. Length and size of delivery pipe.
8. Length and diameter of suction pipe.
9. Character of the service; that is, steady or intermittent.
10. Type of power available for installing the pump.
11. Space available for installing the pump.
12. Accessibility of pump after installation.

THE universal use of oil as fuel for ships either by burning under boilers or in the internal combustion engine makes proper pumping equipment, how to use it and care for it matters of considerable importance to the marine industry. This article which will appear in two instalments brings out the advantages and disadvantages of various types of pumps for this service; also how they should be connected up for best results.

This paper may aid you in solving your oil pumping problems by indicating the type of pump most suitable for your conditions; and also in making an efficient layout of the entire system. A misfit tool should not be tolerated when it is possible to have the right kind.

Mechanical Behavior of Oils

There are two properties that largely determine the mechanical behavior of oils and other liquids. These properties are *specific gravity* (density) and *viscosity*—(relative fluidity). The specific gravity is the relation by weight of the same volume of oil and water:

$$\text{Specific Gravity} = \frac{\text{Weight of oil}}{\text{Weight of water}}$$

Unless some other temperature is specifically mentioned, the gravity refers to 60 degrees Fahr. In tables the specific gravity is given at 60 degrees which is taken as the specific gravity of the oil at 60 degrees Fahr. as compared to water at 60 degrees Fahr. as unity. The standard scale in the petroleum industry, however, is the A. P. I. (American Petroleum Institute) scale, which is based on the following relation to specific gravity:

$$\text{Specific gravity} = \frac{141.5}{131.5 + ^\circ \text{ A.P.I.}}$$

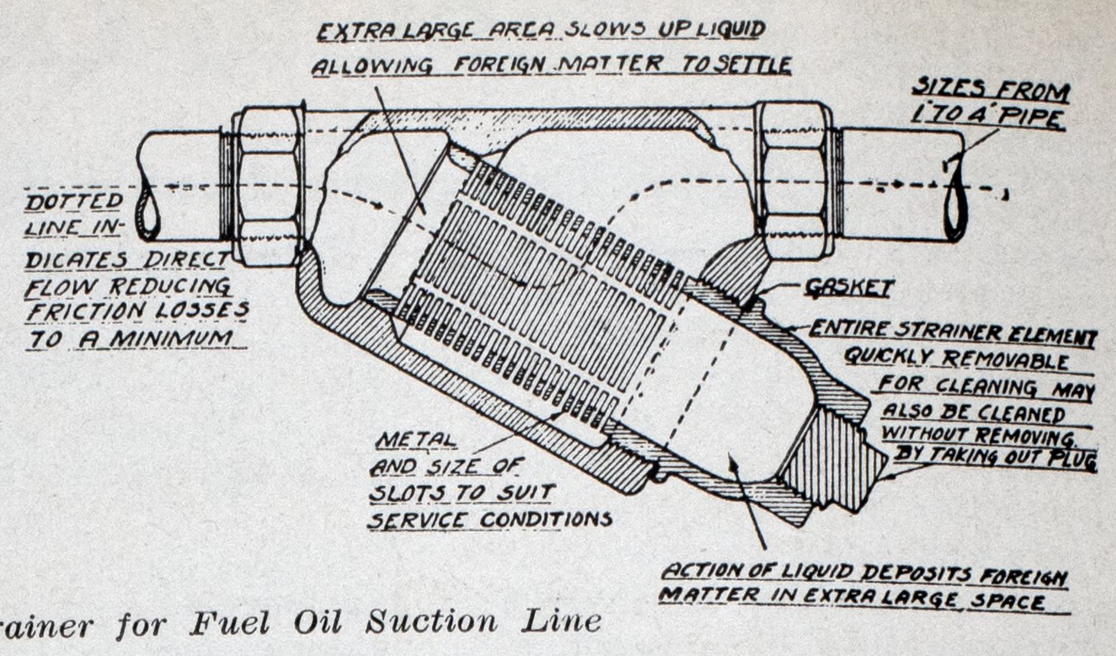
$$\text{and Degrees A. P. I.} = \frac{141.5}{\text{S. G. } 60^\circ/60^\circ} - 131.5$$

for liquids lighter than water.

Viscosity is the resistance which the particles of a liquid offer to sliding past each other. Low viscosity means that the particles slide easily, as in water, gasoline and the like. High viscosity means that the particles do not slide easily, as in low gravity fuel oils, cylinder and bright stocks, etc.

In designing a system for moving fuel oil and lubricating oils, or other liquid product, at a port or terminal, it is therefore desirable to know what products are to be handled, their approximate physical characteristics, and the rate at which it is desired to

IT is extremely desirable that all types of rotary pumps have a strainer placed in the suction line in order to keep out of the pump any large particles of foreign matter which otherwise would enter; for, owing to the construction of all types of rotary pumps this foreign matter would jam in the small clearance spaces and would either interrupt operation or break the pump.



Suitable Strainer for Fuel Oil Suction Line

move the product through the line, since upon this latter fact depends largely the size of pump and lines.

In pumping oil or other product from one location to another through pipes, the principles of suction and pressure are used—generally, a combination of the two.

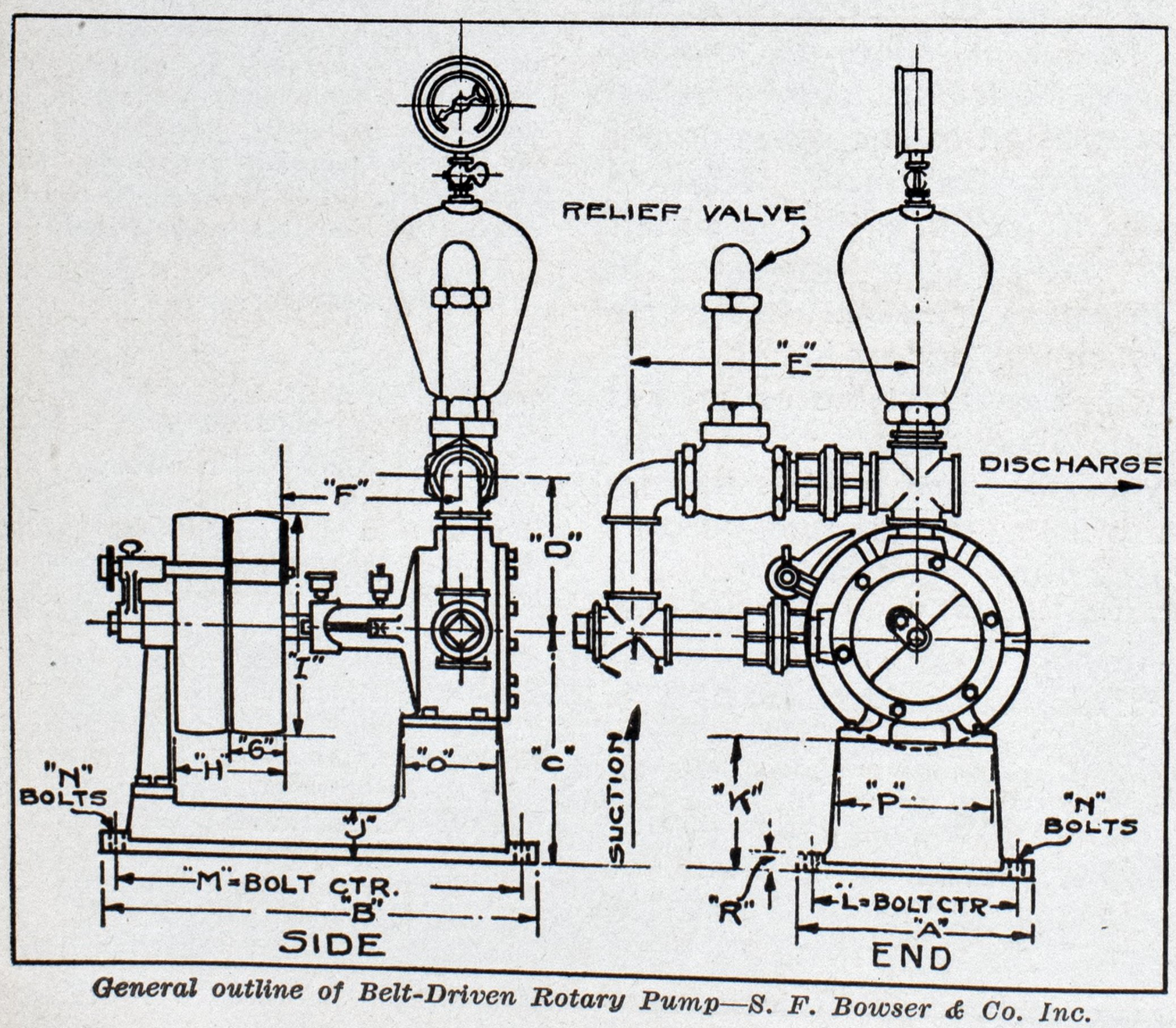
Pumps used in moving fuel oil and lubricating oils are usually either of the piston or rotary types. In piston pumps a plunger moves the fluid and puts pressure behind it. Such pumps may be either steam or power-driven. There are two general classes of rotary pumps, namely, the gear or cycloidal pattern and the rotating-piston pattern. Centrifugal pumps are highly efficient for use in pumping light distillates, but in general because of inherent principles of design they are not suitable for handling heavy oils.

Characteristics

The piston pump is comparatively simple and sturdy piece of equipment. Usually, the steam piston is directly connected to the liquid plunger by means of a rod moving through stuffing boxes. Piston pumps operate on steam at the boiler pressure and, consequently, with few exceptions, fail to utilize the expansive energy stored in the steam. However, those types that do utilize this energy are fitted with fly-wheels, the energy stored in the moving fly-wheels permitting the variable steam pressure. Because of lost motion in the valves, piston pumps do not have so-called dead-centers; in other words it is impossible so to stop them that they will not start when the steam is again turned on.

Air chambers are a necessary feature of piston pumps because the movement of the pistons exerts a constantly changing pressure. Irregular pressure causes both acceleration and retardation to take place in the stream of liquid being pumped and a considerable amount of energy to be lost because of inertia and loss of momentum. Air chambers placed in the discharge line tend to act as buffers and serve to equalize the pressure. Liquids are non-compressible and, therefore, transmit any pressure placed upon them; air and other gases, on the other hand, are readily compressed and hence take up the shock that otherwise would result from sudden pressure changes.

In action, the air in the air chamber is compressed as the pressure increases, and regains its normal volume when the pressure again decreases. In expanding, the air in the chamber exerts pressure on the liquid in the pipe, and thus keeps the velocity of flow fairly uniform. The size of the air chamber for a particular pump system is chosen so that the pressure head in the system remains almost unchanged. In single pumps, the air chamber is about three times the volume of the liquid-piston displacement; in duplex pumps, it is about twice the piston displacement, this difference being due to the fact that the discharge from a duplex pump is much more steady than from a single pump.



General outline of Belt-Driven Rotary Pump—S. F. Bowser & Co. Inc.

Single and Double Pumps

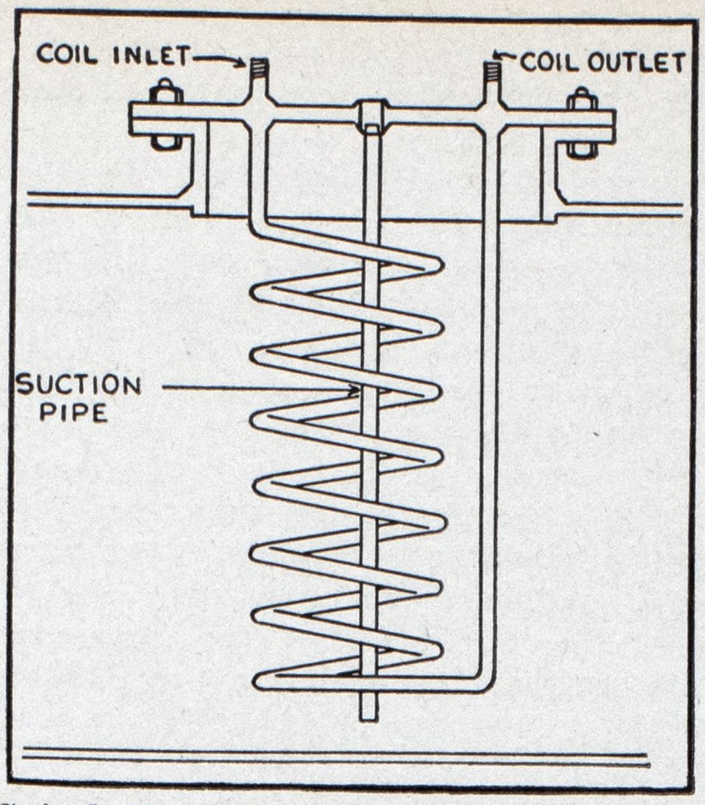
Either the single or the duplex types of steamdriven displacement piston pumps are of low first cost, and, being simple in construction, trouble symptons are easily diagnosed and the necessary repairs are readily made. Single pumps are unequaled in their flexibility as to speed, capacity, and ability to handle either light or heavy oils against any discharge pressure up to the maximum for which their liquid ends are designed. They are especially satisfactory for handling small quantities of liquid against high pressure heads; and small quantities of liquid containing gases, or liquids that must be handled at temperatures at which they readily give off vapors at negative, or suction, heads. When the service so requires, steamdriven piston pumps may be automatically controlled by suitable speed and pressure governors. Such pumps may always be protected by an excess pressure governor from any damage that would result from sudden closing of the discharge valve.

The first rotary gear pump was invented by Serviere, a Frenchman, born in 1593. In its simplest design it consists of two spur gears, meshed closely, and enclosed in a case that also fits closely to the sides and outer

faces of the gears, but leaves a clearance in the triangular spaces between them. One of these spaces is connected to the suction; the other, to the discharge end of the pump. As the gears revolve together, toward each other, liquid flows into the space remaining between the teeth and the rim of the case and thereupon is carried to the discharge side. As the two gears mesh closely, the liquid brought forward in the spaces between the teeth can not escape between the gears, and therefore, it is forced out of the discharge port.

Rotary pumps used for transferring fuel and lubricating oils may be so installed as to create either suction or pressure, as desired by the user. The suction method, however, is preferable because of the fact that the pumps can be set to work more rapidly, and disturbances more certainly avoided. For handling heavy oil rotary pumps should be steam jacketed.

In the cycloidal pattern of gear pump, a modified gear, that has an incurved blade like the teeth of a circular saw, is used. The tip of one blade, as it revolves, sweeps the inner surface of the opposite tooth. The advantage of the use of this type of gear is that larger pockets are obtained in relation to the weight of metals in the rotors. These gears will not revolve each other and, for that reason, spur



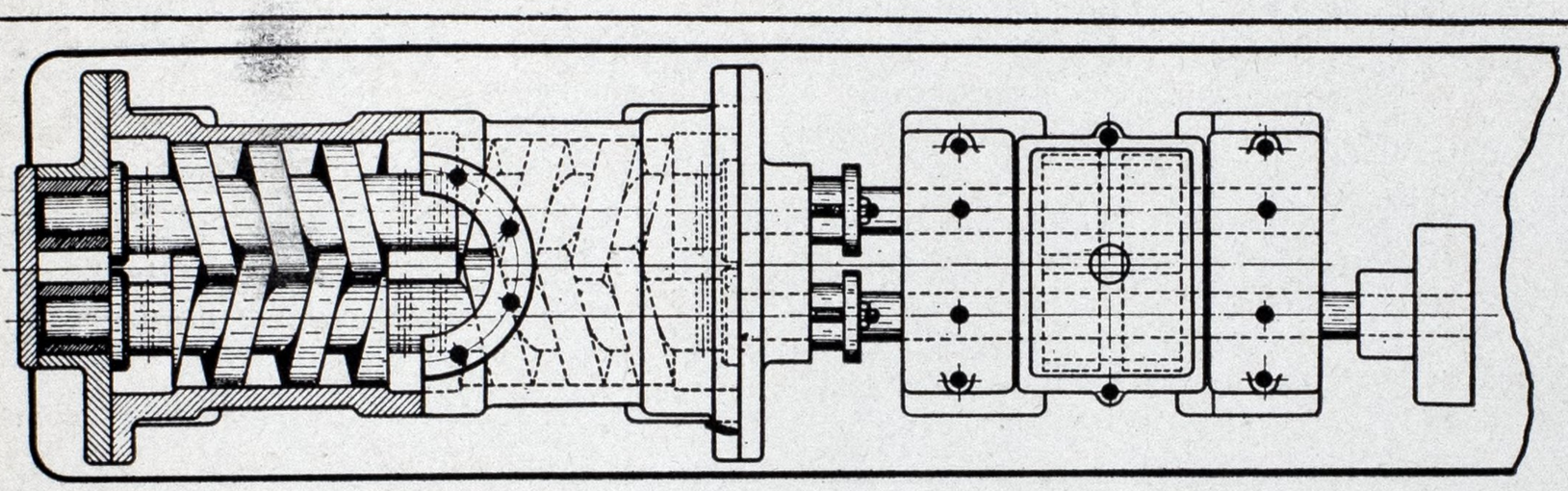
Spiral Heating Coil Around Suction—Sharpsville Boiler Works Co.

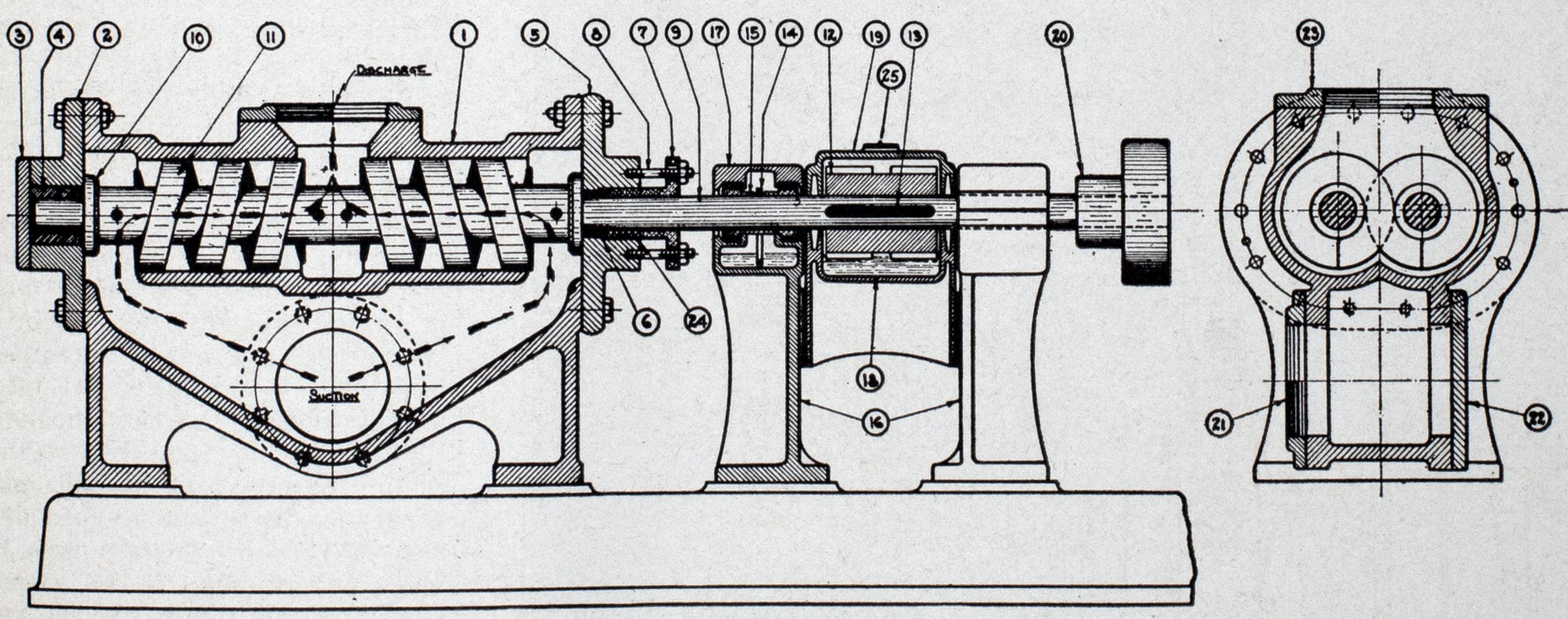
gears outside the case are provided in order to hold them in their proper, relative positions.

The advantages of the gear type of pump are that it is readily driven by power: it is very light and comparatively inexpensive: and it gives an absolutely regular and pulseless discharge. Its chief disadvantage is that, unless properly designed, clearances within it between the moving and the stationary parts rapidly increase, because of the cutting of the rubbing surfaces by the grit contained in the oil being pumped—a condition that is especially true when handling fuel oil, which always contains more or less sediment; and, since many makes of rotary pumps do not provide for this circumstance, there is often excessive wear in such pumps. One leading manufacturer of rotary pumps minimizes this wear by designing the pump so that the buckets are hung in the rotor in such a way that they ride on the cylinder wall with extremely light contact, similar to a balanced valve on a steam engine. Another important feature of this action is that the buckets take up their wear automatically, thus making a perfect seat on the cylinder wall at all times.

The rotating piston type of rotary pump consists of a cylindrical drum, with a revolving shaft of large diameter running lengthwise. A vane as long as the drum and as wide as the diameter slides freely through a seat in the shaft, which is set close to one side of the barrel. As the shaft revolves the vane sweeps both sides, so that the space remaining on one side is alternately increased and decreased. The suction intake is on the wide side; the discharge, on the narrow side. The advantage of the vane type of pump is that allowance is made for wear by providing for the use of wider vanes and for relining the barrel.

The *theoretical discharge* of a





Part No.	Name of Part	Material	Part No.	Name of Part	Material	Part No.	Name of Part	Material
1	Body	Semi-St.	10	Thrust Washers	C.I.	18	Gear Housing	C.I.
2	Rear Head	C.I.	11	Screws	C.I.	19	Gear Housing Cover	C.I.
3	Rear Head Cap	C.I.	12	Gears—(Herring Bone)	C.I.	20	Coupling (Flexible)	C.I.
4	Bearing Bushings	C.I.	13	Keys	Steel	21	Suction Flange	C.I.
5	Front Head	C.I.	14	Oil Rings	Br.	22	Blank Flange	C.I.
6	Bearing Bushings	C.I.	15	Bearings	Comp.	23	Discharge Flange	C.I.
7	Glands	Comp.	16	Stands	C.I.	24	Packing (John Crane No. 150)	
8	Gland Studs	Steel	17	Stand Caps	C.I.	25	Oil Hole Cover	Lead
9	Shaft—(Long and Short)	Steel						

Longitudinal and Cross Sectional Views of Screw Type Fuel Oil Pump

plunger pump is the volume displaced by the plunger per stroke multiplied by the number of strokes per minute. The *actual discharge* may be either greater or less than this amount. The ratio of the actual discharge per stroke to the volume displaced by the plunger per stroke is called the *coefficient of discharge* of the pump; the difference between these quantities is called the *slip*. If the actual discharge is less than the theoretical, the slip is said to be *positive*; if greater, it is said to be *negative*. Positive slip is due to leakage past the valves and plunger. In a steady-working pump with valves in proper condition, this slippage should be less than 10 per cent, although in a new pump it is seldom more than 1½ to 2 per cent.

If the size of the pump cylinder and the number of strokes per minute are known, the theoretical amount that such a pump should deliver can be calculated by the following formula.

Discharge, in gallons per hour = $.204\ Nd^2L$
in which

N = single strokes per minute;
d = diameter of plunger, in inches;
L = length of stroke in inches.

The actual capacity will be from 60 to 95 per cent of the figure given by the use of the foregoing formula, depending on the tightness of the piston, condition of valves, length of suction pipe, etc.

There is a definite limit to the height above the normal level of the liquid to which a pump can lift the liquid by suction; beyond that limit, the pump cannot operate. This height is equal to the length of a column of the liquid of such height that the pressure it exerts at its base is the same as the atmospheric pressure, less the loss in head due to friction in the pipe itelf. Atmospheric pressure varies with the altitude, but the pressure existing most generally in the United States is between 14 and 15 pounds per square inch. This corresponds to the pressure of a column of water about 30 feet high. No matter how good a vacuum is obtained, it is impossible to lift water by suction more than this height above the normal water level. The height to which other liquids can be lifted depends on their specific gravities; for example, strong sulphuric acid could not be lifted by suction above a height of about 16 feet.

In actual pumping operations, the distance of the center of the pump above the normal water-level is rarely more than 10 or 12 feet. Frequently, the pump suction is below the normal water level, in which case the pump is said to be flooded. The only limitation on the horizontal length of the suction pipe is loss of head due to friction. If the sum of the loss of head and the height lifted is greater than the atmospheric pressure, then the stream of liquid in the suction pipe will separate and no liquid will enter the pump.

(*Continued in Next Issue*)

Hoboken Pier Bids

The opening of bids on July 23 by the shipping board for purchase of the government-owned piers at Hoboken, N. J. revealed an offer from Paul W. Chapman, New York, of $4,282,000 for the entire property. The piers were advertised for sale under authority of the Keane-Auf-der Heide law passed in the last session of congress. This property, which formerly was German owned, was seized by the United States government at the outset of the war and has been used in connection with the operation of shipping board lines. The offer submitted by Mr. Chapman will be taken under advisement by the Merchant Fleet Corp. for recommendation to the shipping board.

From Philadelphia to Chicago via Water

By T. W. Hall

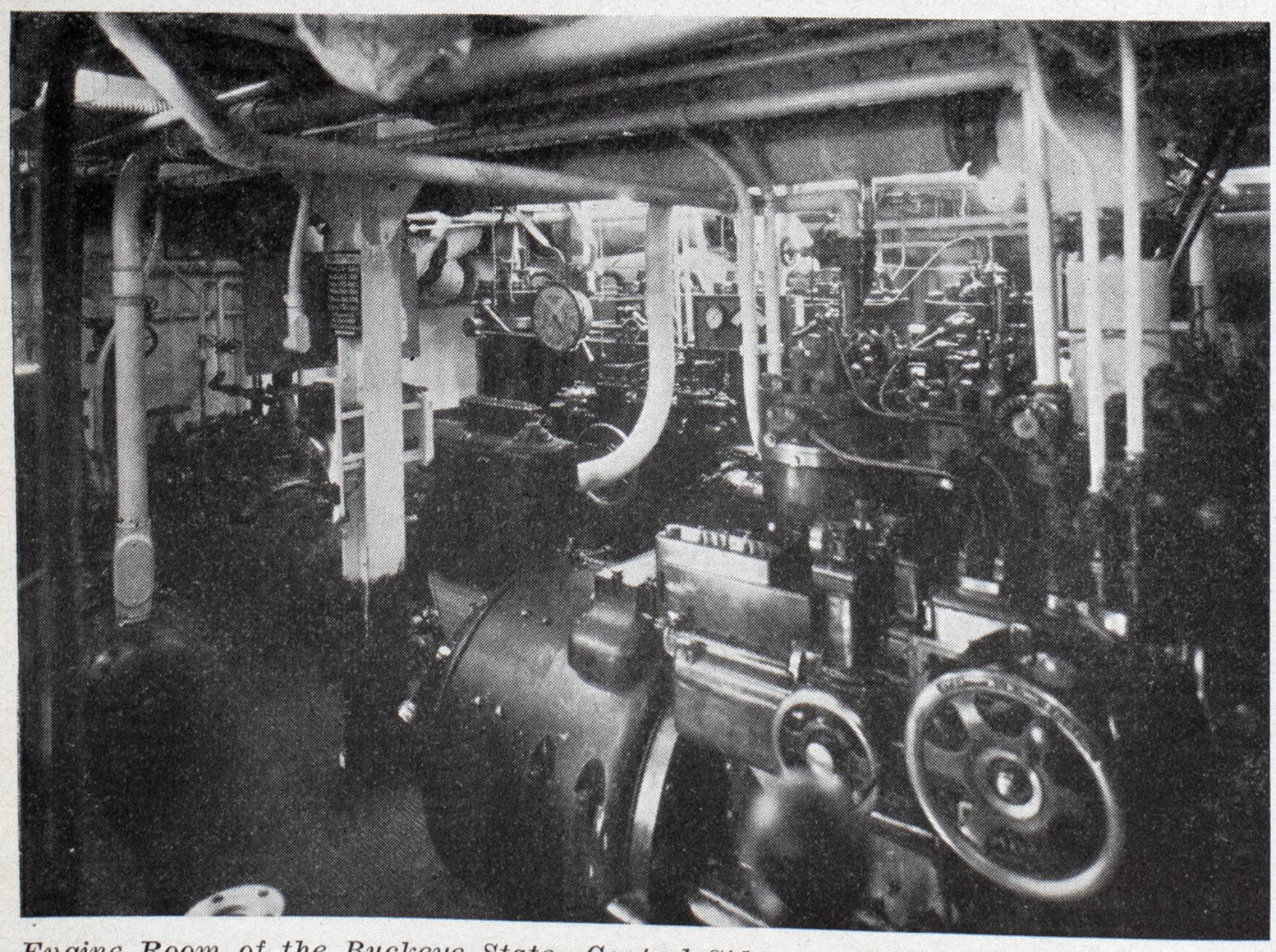
THE diesel barge, BUCKEYE STATE, owned by the Federal Motorship Corp. and operated under charter by the Seaboard-Great Lakes Corp., docked in Chicago at 5:35 a. m. July 5, with more than 1700 tons of sugar from Philadelphia. This method of freight transportation between Chicago and the seaboard is becoming not an uncommon occurrence and it is of interest to note that the diesel engine is an important factor in making the undertaking both possible and profitable.

The elapsed time required to make the trip, in this case less than ten days, compares favorably with fast freight schedules between these two points, but the most important feature is the favorable freight rate.

Due to the variety of navigating conditions on a trip of this sort the craft employed must be exceptionally versatile. To obtain maximum displacement with minimum draft the hull is of the flat bottom type and because of canal bridges, the height above the water line is reduced to a minimum. The craft must also be able to navigate and maneuver easily on the lakes, through canals and rivers as well as on the open sea. The diesel engine is suitable for this type of craft because it gives maximum power in minimum space and with minimum head room. In addition the cost of operating the diesel engine is so low that it permits a margin of profit for the undertaking. The BUCKEYE STATE had been in service less than a month when she undertook her first inland voyage and her performance on this trip has been watched with interest by shippers on the Great Lakes.

The BUCKEYE STATE has a length of 246.33 feet, a beam of 43.62 feet and a molded depth of 16.83 feet. Loaded

The author, Thos. W. Hall, is a member of the staff of the Fairbanks, Morse & Co., Chicago.



Engine Room of the Buckeye State—Control Side of the Starboard Main Engine—Two of the Three Diesel Engine Generating Units

to her maximum capacity of 3000 tons her draft is 12 feet 6 inches. This draft, however, is too great to allow passage through the barge canal and consequently on this trip she was loaded only to 1750 tons which gave her a draft of 9 feet 6 inches. The overall dimensions of this barge are practically the maximum that will allow passage through the barge canal and under the bridges. The accompanying illustration showing the BUCKEYE STATE tied up at her wharf in Chicago brings out clearly the squat construction employed.

Lowering the Superstructure

In negotiating the canals all of the superstructure is taken down to permit passage under the lowest bridges. The exhaust stacks are hinged so that they can be folded back and the ventilators are removable. The two masts are of telescoping type and are provided with a rack by means of which they can be lowered a section at a time down into the hull. The rack and gear are motor driven so that no manual effort is required for this operation. Stripped down in this fashion the clearance from the top of the pilot house under the lowest bridges is approximately 30 inches. This absence of superstructure also has the advantage of making the craft more manageable in the open sea by reduction of side wind resistance.

The main propelling equipment consists of two Fairbanks-Morse model 35-B, 6-cylinder marine diesel engines. These engines are rated at 400 horsepower each at 250 revolutions per minute and drive through two propellers 82 inches in diameter by 50 inches pitch giving the barge a speed, in open water, of approximately 9½ knots. There are two water washed exhaust stacks provided, one for each main engine, which also serve the auxiliary generating units. There are three of these, the first one being a Fairbanks-Morse model 41-C, 3-cylinder diesel engine generating unit of 60 kilowatts capacity. The second is a 4-cylinder model 40, 40-kilowatt unit and the third a 2-cylinder model 40, 20-kilowatts unit. All are equipped with direct current generators which supply current at 125 volts for the operation of all auxiliary equipment, lights and deck winches.

Auxiliary equipment includes a Fairbanks-Morse 2-stage, 50-cubic foot air compressor direct connected to a 20-horsepower, 150-volt direct current motor of marine type provided with manual starter, as well as a 2-stage, air compressor direct connected to a 3-horsepower engine. There are also two built-in, single stage, air compressors on the main engines.

Pumping equipment includes two centrifugal pumps driven by 20-horsepower, compound wound motors operating at 1150 revolutions per minute. Each has a capacity of 1250 gallons per minute against a 40-foot head. The bilge pump is a 5 by 6 power unit which is fully brass fitted for handling sea water. It has a capacity of 147 gallons per minute against a 35-foot head and is driven by a 7½-horsepower motor. Sanitary and fresh water pumps include two 2-inch centrifugal units having a capacity of 80 gallons per mniute each, against a 40-foot head each driven by a 2-horsepower, 750-revolutions per minute motor.

Additional equipment includes electric tachometers, exhaust pyrometers, oil strainers, oil centrifuge and two

Diesel Barge Buckeye State Docked at Chicago 10 Days Out of Philadelphia—Unloading a Cargo of Sugar—Via Hudson River and Barge Canal

inches duplex enclosed, self oiling engine room signals—one for each main engine. This dual signalling system from the pilot house permits of manipulation of either the port or starboard engine to facilitate maneuvering at close quarters.

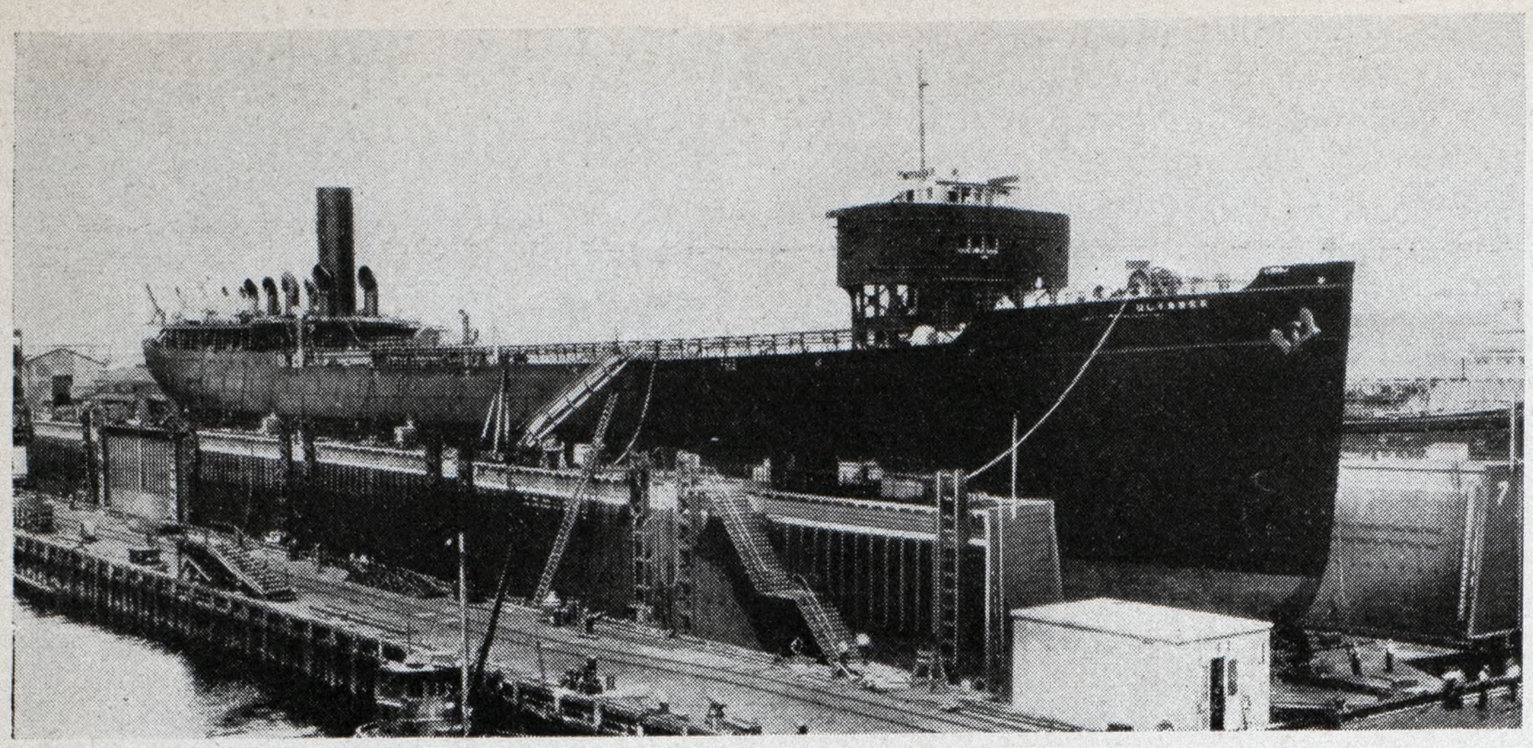
The fuel oil capacity of the BUCKEYE STATE is 17,400 gallons. On her trip from New York city the fuel consumption over a distance of about 1500 miles was 10,119 gallons including all auxiliaries. This would indicate a cruising radius of about 2500 miles without refueling.

Inasmuch as the barge, including her hull and all of her equipment, is built to Lloyd's seagoing specifications she is able to negotiate open sea without tug escort as is usually necessary with canal barges. In detail her schedule from Philadelphia is as follows—She left Philadelphia on the morning of June 25 at 10:15 a. m. proceeded down Delaware bay into the Atlantic, thence north to New York arriving there at 3:40 p. m. on the following day. There she bunkered fuel and left again at 5:15 on the same day for her trip to Chicago arriving at her destination at 5:35 a. m. on the morning of July 5 after passage up the Hudson, through the New York State barge canal system into Lake Ontario and through both the old and the new Welland Canal into Lake Erie, Lake Huron, and Lake Michigan. Practically one full day was consumed in going through the Welland canal. When the new canal is completed throughout, this time can be reduced 10 to 12 hours.

Both Captain Peterson and Chief Engineer Pierson, who have had previous experience with motor barges, were enthusiastic with the performance of their latest charge and expressed the belief that barge transportation between the Great Lakes and the seaboard will increase very rapidly within the next few years and will eventually take a great deal of certain kinds of tonnage now being handled by rail.

Locate Pinthis Wreck

The wreck of the tanker PINTHIS, sunk on June 10 in collision with the Merchants & Miners liner FAIRFAX, has been located about 400 yards north northwest of No. 4 gas buoy off Scituate, Mass. She is lying on her port side on a sandy bottom in about 96 feet of water. Her tanks had apparently not exploded. The speed indicator on the bridge was found set at half speed.



Ulysses in New 12,000-ton Dock at Staten Island Plant, United Dry Docks

Tanker Ulysses Now Ready for Regular Service

GIVEN a new calling by a complete transformation, the former naval collier ULYSSES now is ready for service as one of the largest and fastest oil tankers in the world. Converted at the Mariners harbor, Staten Island plant of United Dry Docks, Inc., the former coal carrier now is a thoroughly modern tanker in every respect.

In her new identity as the property of the American Tankers Corp., she represents an outlay of approximately $1,000,000 and was transformed in 6 months as against 15 or more months usually required for the construction of a new tanker.

In keeping with the most modern tanker construction methods, two longitudinal bulkheads 260 feet long and eight athwartships bulkheads have been installed, giving the vessel 24 tanks with a capacity of 110,000 barrels. Each tank has been fitted with heating coils and cargo piping leading to new and fast pumps which will permit discharge of a full cargo within 15 hours.

With a dead weight tonnage of more than 14,000 tons, the ULYSSES will accommodate cargoes up to 110,000 barrels and therefore in size alone ranks among the largest tankers of the world. From a standpoint of speed the ULYSSES is in a class by herself, being powered with twin screw engines developing more than 7000 horsepower which will provide a speed of 15 knots. New propellers designed to increase the ship's speed also have been fitted.

The ULYSSES is 514 feet long, 65.2 feet wide and 36.5 feet deep. Outwardly there is no indication that she is a converted tanker. Conforming to the conventional tanker design, her propelling machinery is located aft and the navigating bridge forward. Her interior bulkhead arrangement is in accordance with modern practice, the division of length with two longitudinal bulkheads instead of one serving to augment her structural strength. In the re-building more than 1500 tons of new steel were used.

Originally built by the navy in 1915 to carry coal to the Panama canal, and inasmuch as the navy has other ships of a similar design, plans for the conversion of the ULYSSES were approved by the navy with an idea that other colliers might be similarly transformed.

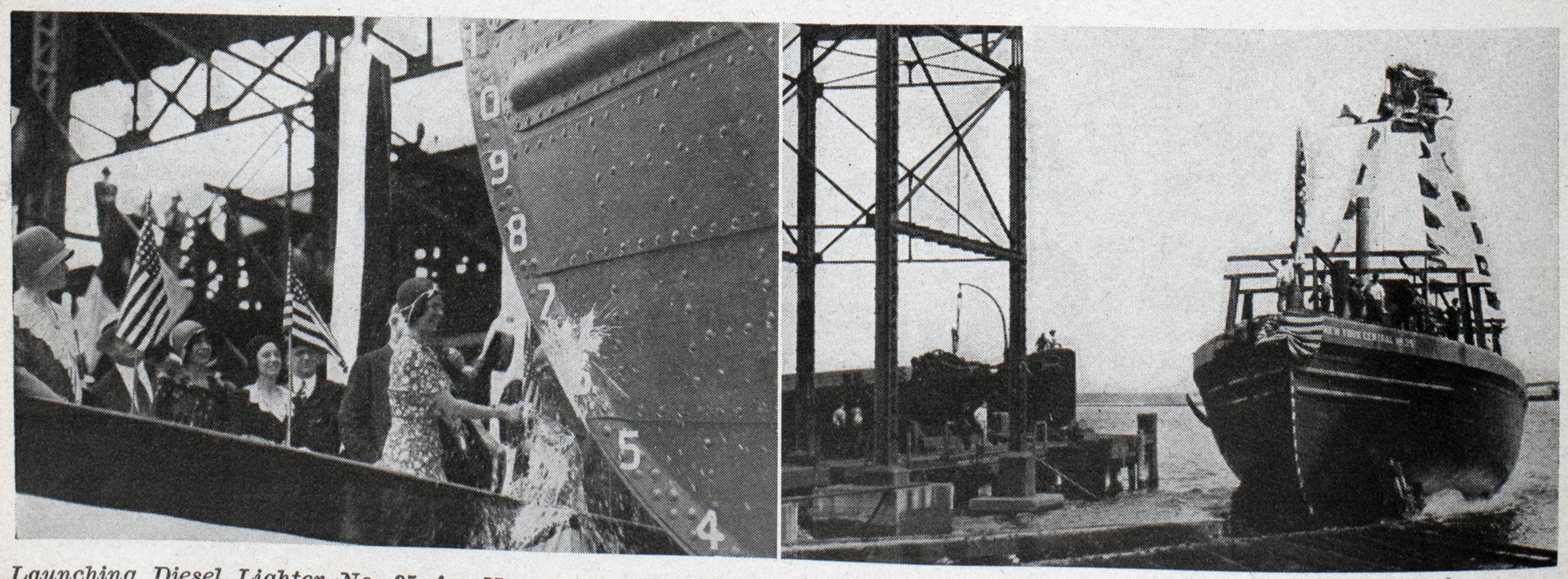
Diesel Lighter is Launched for New York Central

WITH Miss Dorothy V. Dinan, daughter of D. W. Dinan, general manager of the New York Central, acting as sponsor, diesel lighter No. 35 was launched from the United Dry Docks, (Staten Island plant) N. Y., Aug. 12. When finished, this new addition to the New York Central fleet will make a total of forty-five self propelled boats now plying their way around the waters of Manhattan.

The lighter which is of the covered type is 122 feet long on deck; has a 32 fot, 6-inch beam, and is 14 feet, 6 inches deep. A single screw is direct connected to a 600 horsepower Ingersoll-Rand diesel engine. The keel was laid during February, and the boat will be in service during September.

Among those at the launching ceremony were: D. W. Dinan, general manager of the New York Central; F. N. Melius, assistant general manager; George S. Clark, marine superintendent; A. W. Shaffer, marine assistant; captain D. H. Riley, assistant superintendent, marine department; B. F. Ward, retired supervising engineer of the marine department; A. J. Birch, superintendent of construction and repairs; Geo. H. Bates, vice president United Dry Docks, Inc., J. W. Millard, designer of the lighter; his son Harold; Mrs. D. W. Dinan, Miss Margaret Calkins, daughter of A. E. Calkins, superintendent of rolling stock; Miss Vivian Watkins, Olyphant, Pa.; Miss Leona Brown, daughter of R. M. Brown, superintendent of motive power; Dorothy V. Dinan, sponsor; Mrs. George H. Bates, L. V. Armstrong, Ingersoll-Rand Co.; and Mrs. Harold Millard.

The trip to the scene of the launching was made on the flagship of the New York Central fleet, tug No. 33, in charge of Capt. R. Balsam.



Launching Diesel Lighter No. 35 for New York Central at Staten Island Plant of United Dry Docks Inc., Aug. 12. The Sponsor, Miss Dorothy V. Dinan, is the daughter of D. W. Dinan, General Manager of New York Central

Commands New White Star Motor Liner Britannic

CAPTAIN Frederick Fletcher Summers, R. D., R. N. R., retired commander of the new White Star liner BRITANNIC, is one of the younger masters of the line, having joined the company in 1899. He was relieved of command of the ALBERTIC several months ago, that he might go to Belfast and stand by while the new motor vessel was receiving her final grooming for the transatlantic service.

Captain Summers was for several years assistant commander of the MAJESTIC and is familiar with handling vessels of great tonnage. He comes from a seafaring family, being the son of the late Captain J. E. Summers, a well-known master in the service of sail and steam out of Liverpool. The BRITANNIC'S commander himself saw service in sail, serving his apprenticeship in the four-masted bark ELLESMERE running out of London in Australian trade. He joined the White Star line at the age of 25 as junior officer of the old CUFIC. In addition to his service in the MAJESTIC he has commanded the GALLIC, CERAMIC, MEDIC, PERSIC, DORIC, MEGANTIC, BELGIC and other steamers of the company. Throughout the world war he was in service at the British naval base at Scappa Flow in the Orkney islands.

Capt. F. F. Summers

R. Stanley Dollar, president of the Dollar Steamship lines, recently was elected chairman of the Pacific Travel association which has been organized by steamship, railroad and hotel executives to promote travel to and from the Pacific coast.

Ralph C. Stoddard, a director of the Antilles Steamship Co. and well known in the ship brokerage field, was found dead in his home in Mamaroneck, New York, July 23. He had been in ill health for some time.

E. P. Morse Dies in Canada

E. P. Morse, recently retired president of the United Dry Docks Inc., died suddenly at Digby Gut, Nova Scotia, while supervising the erection of a new $250,000 mansion. Mr. Morse was a native of Canada and came to Brooklyn, N. Y., at the age of 20 where he developed a small shipsmith shop into a $20,000,000 ship repair concern. As the Morse Dry Dock & Repair Co., now one of the units of the United Dry Docks Inc., this concern is known all over the world wherever shipping plies. It is one of the biggest ship repair plants in the Port of New York or in any other port.

L. D. Naudain, chief electrical engineer in charge of naval vessels for the New York Shipbuilding Co., has become consulting engineer for Cory. Victor Carbonara, formerly production engineer of the Pioneer Instrument Co., has been made chief engineer, and Joseph Harper superintendent of the service and installation department.

Meyer Lissner, former member of the United States shipping board, died at his home in Los Angeles on July 28 after a heart attack. He was 59 years and had been ill for several months. He was appointed to the shipping board by President Harding in 1921 and served until the end of 1925, when he resigned.

Engine Room for Motor Liner in Able Hands

OVER two years ago, when the type of engine for the new White Star Liner BRITANNIC was decided upon, Albert Wharton was chosen as the vessel's chief engineer. Mr. Wharton, an expert in motor propulsion, and the greater part of his staff, including George Montgomery, assistant chief, were stationed at the shipyard of Harland & Wolff, Belfast, for a year, observing the installation of the BRITANNIC'S motors and assisting in the seatrials. Meanwhile he and the senior engineers made observation trips on various motor ships of the Royal Mail, Elder Dempster and Union Castle lines.

Mr. Wharton joined the White Star line as a junior engineer in 1900, serving on many of the company's ships, including the CERAMIC and RUNIC. While in the latter vessel he was appointed assistant superintendent engineer of the line at Liverpool. The BRITANNIC is the first vessel in the White Star line's transatlantic service to have a chief and an assistant chief engineer. The difference between steam and diesel oil propulsion and the compartive novelty of the latter type to British engineers make it necessary to have two experts in charge of the engine room to insure the most careful and efficient operation.

Albert Wharton

Elected President, New York Propeller Club

E. F. CLARK, marine supervisor of the New York office of the Westinghouse Electric & Mfg. Co., recently was elected president of the Propeller Club of the United States Port of New York, at the seventh annual meeting of the club, succeeding Benn Barber.

Mr. Clark is a native of Denver and graduated from the University of Colorado in 1914 with a degree in mechanical engineering. He joined the Westinghouse Machine Co., East Pittsburgh, in 1914 as an engineer apprentice and was transferred to the commercial engineering division of the Westinghouse Electric & Mfg. Co. in 1915. Since that time he has held several technical positions with the company and in May, 1925, was transferred to be special field representative in the marine department, New York. He is a member of the Society of Naval Architects and Marine Engineers and also the American Society of Naval Engineers, and the Engineers club.

E. F. Clark

B. D. Pender, for many years in the service of the shipping board and other government agencies, has been appointed assistant to William Perrott, manager of construction department B, United States lines. Mr. Pender is widely known as an expert in ship furnishings and his duties will be in connection with the hull and interior work on the two 30,000-ton liners to be built for the line by the New York Shipbuilding Co. at Camden, N. J.

Merchant Fleet Head Dies

John R. Gordon, president, of the Merchant Fleet Corp. died in Washington on Aug. 26, following a major operation.

Up until a day or two before his operation, which took place on Aug. 24, Mr. Gordon had been extremely active in government shipping affairs. He was a hard worker and devoted long hours to his difficult tasks. He assumed his position last December and his intensive application to his duties contributed materially, it is believed, to the illness which ended in his death.

A practical shipping man, he brought to government marine affairs an experienced judgment which was showing excellent results in the economies he instigated.

Ship Repairing Facilities Are Enlarged and Improved

WITH its program of expansion and improvement completed this fall the Todd Shipyards Corp. will have increased the facilities of each of its seven ship construction and repair yards. Additional and larger dry docks, new and longer piers, greater berthing space and modern machines have been provided to care for any size or type of ship repair work.

The improvements now nearing completion have been made not only in the four yards in New York but those in Mobile, New Orleans and Seattle.

The Todd corporation owns the largest dry dock in New York and the only private graving docks in the port. To complete the service in these docks it is installing a 20-ton travelling gentry crane, tracks for which are being laid between Nos. 1 and 2 graving docks at its Robins Dry Dock and Repair Co.'s plant at Erie basin, Brooklyn. Other additions to the equipment include a new shop for turbine work, with dynamic balancing ways for turbine rotors and a large stock of blading for any type of turbine driven vessel entering the port.

An extension of the main machine shop provides 16,509 square feet of additional floor space. Special equipment is available for all classes of diesel engine repair and maintenance.

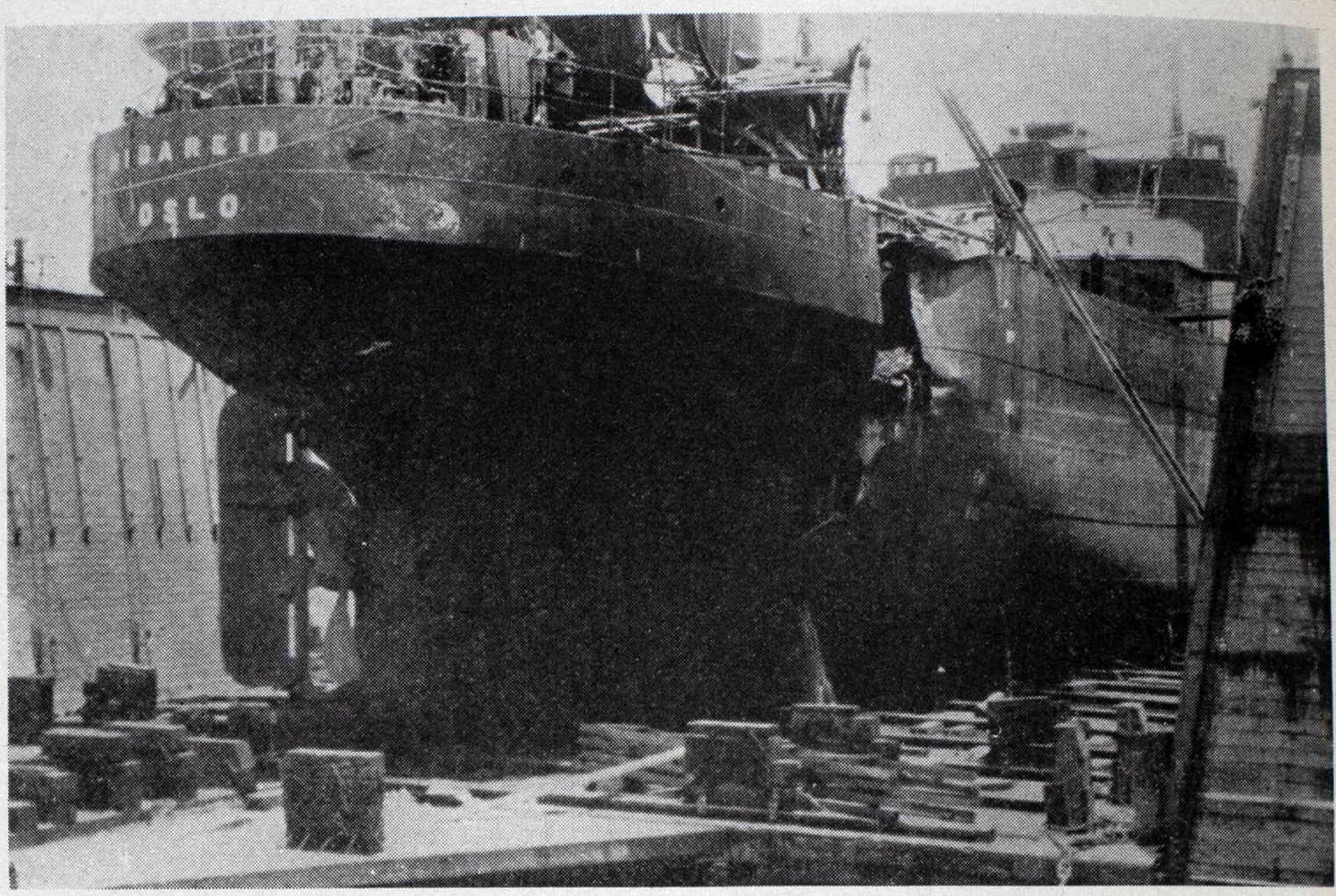
A new slip extending inshore 555 feet between piers Nos. 4 and 5 has been provided with a width of 158 feet and a depth of 40 feet at mean high water. Pier 1 has been rebuilt and Pier 2 rebuilt and widened.

Designed to meet the requirements of the best medical practice, a new emergency hospital has been established in this plant. It contains a modern operating room, first aid emergency room, X-ray laboratory, eye treatment room, a gymnasium with machines for corrective exercises, showers, baths, staff room and offices.

To the Clinton street plant of the Todd Dry Dock, Engineering and Repair Corp., has been added a floating dry dock with an overall length of 265 feet, 84 feet 4 inches width and a lifting capacity of 3000 tons. A second story has been added to the office building and the yard lay-out rearranged to expedite the handling of repair work.

The berthing facilities at the Tebo plant of the Todd Dry Dock, Engineering and Repair Corp., have been increased by a 300 foot inshore extension of pier A. The slip between piers B and C has been dredged for the reception of a new 6000 ton floating dock and other improvements made for the convenience of the big yachts that make this yard their home port.

The activities of the Todd oil burner and the Todd unit system of burning pulverized fuel divisions of the Todd corporation are also centered at this yard, where a testing plant is maintained for research purposes in the development of equipment for the burning of pulverized fuel.



S. S. Nidareid on the Todd Dock at New Orleans with Heavy Damage as a Result of a Collision with the S. S. Delight

At the Hoboken plant of the Tietjen and Lang Dry Dock Co., floating docks No. 2 and 5 have been given a greater and faster lifting capacity by the installation in each of four new centrifugal pumps. The wings of floating dock No. 6 have been raised to enable the dock to accommodate vessels of greater draft and the efficiency of this dock has been increased by the rearrangement and installation of new machinery.

For further expedition in the handling of vessels at this plant a new 25-ton floating crane with latest equipment and powered by a Mundy engine has been placed in service. The rebuilding and concrete surfacing of Pier F is practically completed and other improvements carried out in the machine, blacksmiths and joiner shops. Each of the other six floating docks at this plant have been overhauled.

The Todd yard at Mobile, Ala., is the largest ship repair plant on the Gulf and with the completion of two new piers it has berthing capacity for more than fourteen vessels. Each pier has a standard gage railroad track running its full length with connections to shore tracks. Besides complete shop equipment this plant has two floating docks of 12,000 and 8,500 tons lifting capacity respectively.

At New Orleans the Todd corporation operates two plants. One for han-

(*Continued on Page* 66)

Tietjen & Lang Plant of the Todd Shipyards Corp. at Hoboken, N. J.

Marine Business Statistics Condensed

Record of Traffic at Principal American Ports for Past Year

New York

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	578	2,717,787	616	2,815,336
June	585	2,722,344	559	2,596,692
May	592	2,697,642	643	2,955,826
April	558	2,662,532	574	2,601,047
March	546	2,490,027	562	2,470,228
February	508	2,280,543	512	2,272,393
January	542	2,506,444	572	2,658,125
December	517	2,331,342	518	2,257,424
November	520	2,236,677	537	2,387,932
October, 1929	564	2,591,207	561	2,561,403

Philadelphia

(Including Chester, Wilmington and the whole Philadelphia port district)
(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	96	246,866	68	151,861
June	92	240,323	72	169,627
May	105	271,618	64	143,167
April	89	236,257	63	177,289
March	96	285,754	58	190,093
February	86	248,417	67	194,809
January	94	281,558	66	202,453
December	87	237,510	49	143,761
November	80	222,026	48	133,872
October, 1929	99	262,305	62	154,401

Boston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	152	325,325	110	222,555
June	152	325,325	110	222,555
May	163	362,849	114	274,019
April	105	298,347	76	203,497
March	85	271,423	57	193,317
February	87	281,012	44	159,767
January	93	306,097	42	128,581
December	95	286,749	62	208,978
November	101	332,269	67	221,318
October, 1929	95	310,386	56	196,590

Portland, Me.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	42	83,987	42	84,939
June	39	70,119	34	60,536
May	31	46,797	33	52,619
April	17	47,308	20	52,313
February	26	71,155	21	57,834
January	27	72,734	26	71,929
December	22	47,329	23	51,644
November	26	51,231	26	50,475
October, 1929	25	54,402	25	56,022

Providence

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	10	36,403	5	19,623
June	6	26,588	4	18,640
May	7	28,953	6	23,794
April	10	44,564	6	24,407
March	7	31,668	5	23,382
February	12	44,382	7	28,774
January	13	48,880	5	24,055
December	10	35,615	4	16,406
November	10	38,203	6	22,371
October, 1929	6	20,741	8	32,974

Portland, Oreg.

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	30	118,919	53	193,425
June	31	122,569	48	175,167
May	32	122,714	49	179,845
April	32	121,646	46	167,358
March	26	103,710	44	159,420
February	31	123,100	47	185,192
January	31	122,031	44	165,208
December	39	146,486	53	118,117
November	34	129,809	65	234,575
October, 1929	39	148,172	59	221,007

Baltimore

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	132	444,823	144	455,226
June	153	486,645	157	481,837
May	152	457,169	150	463,958
April	166	502,204	179	529,912
March	141	438,638	139	433,168
February	139	432,422	142	431,664
January	131	422,932	135	435,506
December	134	415,201	134	425,362
November	132	438,274	137	446,120
October, 1929	138	450,603	146	463,723

Norfolk and Newport News

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	27	63,721	60	144,446
June	23	52,701	43	109,274
May	28	58,214	53	131,768
May, 1930	28	58,214	53	131,768
April	14	35,914	61	178,792
February	21	47,835	59	180,510
January	13	27,927	75	208,959
December	30	75,636	58	164,287
November	39	50,600	79	204,216
October, 1929	32	87,466	79	209,997

Jacksonville

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	6	14,312	8	20,739
June	10	25,129	12	23,737
May	14	32,001	19	51,210
April	13	23,378	13	27,999
March	17	26,625	12	23,963
February	14	35,002	13	31,353
January	12	24,225	16	31,722
December	19	36,831	12	20,409
November	10	22,938	10	18,750
October, 1929	12	20,268	8	19,134

Key West

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	56	68,968	55	69,397
June	57	69,679	56	68,653
May	104	120,788	108	120,160
April	89	90,105	82	90,249
March	93	89,490	76	86,235
February	85	90,050	70	87,109
January	74	86,081	71	85,990
December	68	78,984	65	78,634
November	84	97,555	83	97,217
October, 1929	74	88,850	75	88,853

Mobile

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	113	211,989	95	173,549
June	113	211,446	111	212,639
May	98	169,700	106	203,070
April	115	225,516	119	235,115
March	131	280,484	126	286,119
February	104	254,408	116	276,137
January	118	281,672	108	256,384
December	110	262,685	101	238,149
November	107	231,376	111	259,712
October, 1929	123	304,950	119	294,276

Seattle

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	54	248,954	60	261,746
June	49	215,525	53	228,554
May	54	235,178	53	222,715
April	55	230,429	55	217,705
March	52	205,674	59	245,363
February	55	231,213	47	195,156
January	51	229,516	55	246,266
December	57	292,419	62	302,713
November	68	278,207	73	306,493
October, 1929	72	293,569	68	277,041

New Orleans

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	270	697,526	245	653,562
June	233	606,340	239	626,307
May	260	686,543	251	662,383
April	226	712,630	261	701,159
March	255	703,361	263	699,493
February	263	715,681	237	630,673
January	252	706,945	260	715,903
December	273	772,310	279	785,160
November	268	736,452	269	739,461
October, 1929	244	681,983	261	713,490

Charleston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net. tonnage	—Clearances— No. ships	Net tonnage
April, 1930	22	49,651	26	56,022
March	32	70,250	24	60,834
February	20	52,660	18	44,494
January	25	61,031	22	58,857
December	16	42,198	19	46,455
November	24	62,691	27	75,588
October	24	62,345	25	65,733
September	19	52,795	12	32,870
August	17	37,818	15	29,341
July, 1929	11	21,622	10	20,558

Galveston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	40	93,999	83	249,064
June	28	60,622	63	171,223
May	35	59,807	82	240,137
April	26	39,332	66	183,706
March	24	31,987	82	235,656
February	26	48,200	68	197,140
January	30	77,176	87	274,299
December	27	65,306	104	358,823
November	28	68,030	108	332,315
October, 1929	36	88,056	118	385,367

Los Angeles

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
June, 1930	240	632,188	225	641,270
April	214	639,153	200	637,922
March	211	682,547	218	677,011
February	177	580,092	165	542,392
January	185	601,710	176	596,007
December	212	619,119	178	589,551
November	225	676,209	215	664,661
September	259	621,704	225	605,808
August, 1929	204	583,568	185	554,520

San Francisco

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	166	674,380	166	676,092
June	154	652,411	134	560,605
May	168	709,182	156	625,712
April	161	555,903	156	569,368
March	179	710,763	150	631,782
February	142	565,514	135	567,268
January	158	644,015	149	630,336
December	182	632,677	148	558,136
November	161	620,878	143	579,803
October, 1929	179	696,620	164	667,367

Houston

(Exclusive of Domestic)

Month	—Entrances— No. ships	Net tonnage	—Clearances— No. ships	Net tonnage
July, 1930	30	120,727	42	158,570
June	47	190,145	45	193,620
May	41	146,840	47	172,171
April	38	139,147	57	206,182
March	33	130,108	43	162,519
February	37	149,161	60	226,761
January	28	99,518	43	148,219
December	39	152,270	62	232,090
November	40	143,360	54	185,243
October, 1929	38	139,636	50	185,918

Note: The figures given in this article are for direct entrances and clearances. Additional vessels in foreign trade enter and clear from and to other American ports after original entry and before final departure. At the port of Philadelphia, for instance, additional vessels in the foreign trade in this category were 75 of 247,525 net tons entered and 75 of 243,718 net tons cleared for the month of June.

Latest Data on New Marine Work

Information on New Ships Ordered—Building and Repair Contracts Let—Shipping Board Loans Made, Authorized or Pending

ON July 1, American shipyards were building or under contract to build for private shipowners 263 steel vessels of 475,903 gross tons, compared with 251 steel vessels of 477,053 gross tons on June 1, according to the bureau of navigation, department of commerce.

There were 28 wood vessels of 10,699 gross tons building or under contract to build for private shipowners during the same period compared with 27 wood vessels of 100 gross tons and over, under construction or contract for private shipowners on July 1, 1930.

The Sun Shipbuilding and Drydock Co., Chester, Pa., had the largest quota of steel vessel building on hand July 1 with 108,472 gross tons. New York Shipbuilding Co., Camden, N. J., had under construction or contract 95,725 gross tons of steel vessels. Gross tonnage of steel vessels building or contracted for by the Newport News Shipbuilding & Drydock Co. amounted to 92,600 gross tons. The Bethlehem Shipbuilding Corp. at its San Pedro, Calif. and San Francisco, Calif. yards was building or had contracted to build 65,459 gross tons of steel vessels. The Dravo Contracting Co., Pittsburgh, was building or had under contract 58,159 gross tons of steel vessels. The Federal Shipbuilding Co., Kearney, N. J., had 24,950 gross tons of steel vessels either under construction or contract. The Manitowoc Shipbuilding Corp., Manitowoc, Wis., was building or under contract to build 10,300 gross tons of steel vessels.

Lay Keel for Third Ship

The keel of the EXETER, third new vessel in the Export line's comprehensive building program of four sister ships, was laid Aug. 11 in the yards of the New York Shipbuilding Co., Camden, N. J., with a brief ceremony participated in by H. E. Frick, vice president of the Export line, and several of the shipyard officials.

The ceremony took place in the same ways from which the EXCALIBUR, first of the four new liners to be completed, was launched Aug. 5 with impressive ceremonies at which Mrs. Herbert C. Hoover, wife of President Hoover, acted as sponsor. See page 30, this issue.

Rapidly nearing completion in the same yards is the EXOCHORDA, which will be launched some time next month. Both she and the EXCALIBUR will be ready for the Export line's New York-Mediterranean service by the end of the year.

When the EXOCHORDA has been launched the keel of the EXCAMBION fourth liner in this American flag shipbuilding program, will be laid in the same ways. It is expected that the last two of the four sister ships will be ready for service by the summer of 1931.

The EXETER will be identical to the three other ships in the Export line's building program. She will have a gross register tonnage of 8700 tons, an overall length of 475 feet and a beam of 61½ feet. The hull is of the flush-deck type, with a raking bow and overhanging stern. Accommodations will be provided for 100 first-class passengers in outside rooms. The propulsion machinery consists of Parsons type, triple-series single-reduction steam turbines, which will drive the vessel at a speed in excess of 14 knots.

When completed, the Export line's present building program will represent a total outlay of $9,200,000. The shipping board has advanced the company's 75 per cent of the cost from its construction loan fund.

May Recondition Liner

Bids for the reconditioning of the Los Angeles Steamship Co.'s liner CITY OF HONOLULU, damaged by fire recently at Honolulu, have been submitted by Ralph J. Chandler, vice president and general manager of the company, to Pillsbury & Curtis for analysis. The bids were: General Engineering & Drydock Co., $1,951,347 in 365 days; Los Angeles Shipbuilding & Drydock Corp., $1,940,247 in one year; Moore Drydock Corp., of San Francisco, $2,077,970 in 284 days; Todd Shipyards Corp. of Seattle, $2,075,000 in one year; Todd Shipyards Corp. of New York, $2,390,000 in one year; Bethlehem Shipbuilding Corp. Ltd., $1,925,700 in 285 days. None of the bids included renewal of furnishings or repair of bottom damage.

Colombian Vessels

The Newport News Shipbuilding Company was low bidder for the construction of three new ships for the Colombian Steamship Co., it was announced July 24. Figures were not made public, but it is understood the cost of the three ships will be about $7,500,000.

The company recently received a mail contract from the post office department on condition that it build ships that conform to federal requirements, and it also applied to the shipping board for a loan under the Jones-White act.

The placing of the order for the ships has been delayed pending the revision of plans to meet the demands of the navy department. It is expected that it will be placed in about three months. Plans have been drawn by Theodore E. Ferris, naval architect, of New York. The ships will carry about 150 passengers and will operate between New York and Colombia.

Ask Bids for Cutter

The United States coast guard has invited bids for building United States coast guard cutter No. 54. The bids for the construction of this vessel will be opened at 2.00 p.m., Sept. 12. Cutter No. 54 has the following characteristics:

Hull of steel usual construction. Length over all 250 feet, beam molded 42 feet, displacement about 2000 tons, 15 feet mean draft; Turbo-electric drive, single screw; shaft horsepower 3220.

This vessel must be completed on or before June 30, 1932.

Specifications and drawings for the vessel may be obtained by the shipbuilding companies from the commandant, United States coast guard, treasury department, Washington, who will supply them.

The act approved May 15, 1930, appropriates $100,000 to commence the construction of this vessel and the shipbuilder must limit payment vouchers before July 1, 1931, to this amount. The act provides that the total cost of this vessel and equipment shall not exceed $900,000 and authorizes the secretary of the treasury to enter into contracts not to exceed this aggregate amount.

Builders must possess satisfactory financial resources, technical organizations and plant facilities, to assure full completion of the vessel in the contract time. Attention is invited to paragraph 16 of the standard government instruction to bidders.

No deposit for plans. Bid bond 25 per cent of bid. Performance bond 75 per cent. Liquidated damages $500 per day. Partial payments will be made.

Companies which have been sent plans and specifications follow: American Ship Building Co., Cleveland; Bath Iron Works, Bath, Me.; Bethlehem Shipbuilding Corp. Ltd., New York; Federal Shipbuilding & Drydock Co., Kearny, N. J.; General Engineering & Dry Dock Co., Oakland, Calif; Manitowoc Shipbuilding Corp., Manitowoc, Wis.; Maryland Drydock Co., Baltimore; Navy Department, Washington, D. C.; New London Ship & Engine Co., Groton, Conn; New York Shipbuilding Co., Camden, N. J.; Pusey and Jones, Wilmington, Del; Sun Shipbuilding & Drydock Co. Chester, Pa; Todd Shipyards Corp., New York; and United Dry Docks, Inc., New York.

Bids on New Liner

General Engineering and Dry Dock Co., San Francisco, with a bid of $1,095,000, was the lowest of seven shipyards bidding for the construction of the Red "D" line's new cargo vessel for operation in its New York-Maracaibo service. The low bidder agreed to complete the work in ten months from the date of the award of the contract.

The new vessel, which will be somewhat smaller than the company's CARACAS, will be a 13-knot cargo-vessel with accommodations for a limited number of passengers. She will have an overall length of 329.9 feet, beam of 47.6 feet and a depth of 25 feet. She was designed by Theodore E. Ferris.

The other bids follow: Bethlehem Shipbuilding Corp.'s San Francisco and Fore River plants, $1,220,000 each; the former's time was 14 months, while that of the latter was 20 months; New York Shipbuilding Co., $1,301,000, time 13 months; Newport News Shipbuilding Co., alternate bids, $1,360,370 and $1,340,-350, time 12 months; Pusey & Jones, Wilmington, Del., $1,150,000, time 12 months; Sun Shipbuilding Co., $1,290,000, time 16 months; United Dry Dock's Staten Island plant, $1,-287,000, time 15 months.

Tanker Launched

Noel Robinson, vice-president of the Tide Water Oil Company, headed a large party of company officials and quests who attended at the Sun Shipbuilding & Dry Dock Co., Chester, Pa., the launching of the company's new motor-tanker TIDE WATER. Mrs. R. K. Kelly, wife of the manager of the company's marine department, acted as sponsor of the new vessel.

The TIDE WATER is one of the first vessels to be built under the provisions of the Jones-White act. There are 38 men in the crew and the deadweight tonnage of the vessel is approximately 14,000. The boat has a loading capacity of approximately 116,000 barrels of oil, and will be engaged in carrying gasoline from Pacific coast ports to the Bayonne refinery of the Tide Water company.

This new vessel is 498 feet long, 37 feet deep and has a beam measuring 65 feet 9 inches. She is propelled by a Sun-Doxford diesel engine of 2800 shaft horsepower and has a loaded speed of 11 knots. Her daily fuel consumption is 75 barrels.

Loan Contracts are Signed by Shipping Board

Contracts covering loans aggregating $15,412,500 recently approved for the United Mail Steamship Co. to be used in aid of building six passenger-cargo steamers for the United Fruit company's steamship service to Central America were signed at the shipping board Aug. 6. Chairman T. V. O'Connor signed the contracts for the shipping board and C. D. Doswell, vice president of the United Fruit company, signed for the lines. Three of the vessels are to be built at the Newport News Shipbuilding and Drydock Co., Newport News, Va., and the others will be built at the Bethlehem Shipbuilding Corp. plant at Fore River, Mass. Roger Williams and S. W. Wakeman, respectively, signed for these companies.

The vessels which will be built under these loans will be of the passenger-cargo type, 447 feet long, 60 feet beam, and 24 feet draft, having a deadweight tonnage of 4000 each. They will be equipped with turbo electric power plants and propelled by twin screws. Their average sea speed is expected to be 16 knots. Three of the new vessels will be operated between San Francisco and Puerto Armuellas and three between New York and Port Limon. The ships will go into service in 1931 and 1932.

All these new ships will be driven by the General Electric turbine-electric system of propulsion. The power plant in each boat will consist of two turbine generators developing a total horsepower on the two propeller shafts of 10,500 shaft horsepower at 125 revolutions per minute. Steam will be generated by oil burners under Babcock & Wilcox boilers. The main generators and propulsion motors will be equipped with air coolers.

The propulsion motors on each ship will be two alternating-current motors rated 5250 shaft horsepower each at 125 revolutions per minute. The power plant will be arranged to give 5500 shaft horsepower from one turbine generator when running both motors at 100 revolutions.

In addition to the main generators there will be three 500-kilowatt, direct-current turbine generating sets to supply power for excitation, lighting and the operation of auxiliaries. All the auxiliaries will be electrified. There will also be suitable switchboards, control panels, etc.

Seeks Engine Data

Capt. Henry Gleason, manager of construction for the Grace and Panama Mail lines, is making a round trip on the turbo-electric liner CALIFORNIA to observe the performance of the engines. This information is desired for the guidance of officials of the Panama Mail line in determining the form of propulsion to be used on the four new ships to be built in accordance with the mail contracts held by the line.

Six Diesel Tankers Ordered in German Shipyards

The Standard Shipping Co., subsidiary of the Standard Oil Company of N. J., recent reports indicate, has awarded contracts for six diesel tankers, of about 16,200 tons each, to German shipyards. The shipyards receiving the awards include Germania Werft and Friedrich Krupp, Kiel, Deutsche Werft, Hamburg and Bremer Vulkanwerke, Bremen.

This is a highly satisfactory order to German shipyards and industrialists. The total amount involved is about $7,500,000. Remembering that this company has world wide interests involving trade with foreign nations, there is probably every justification for placing so large an order outside of the United States. The ships will probaby operate under the German flag and have German crews.

In any case a matter of business good will is certainly involved in placing the contract, much as one would like to see such an order placed here instead of abroad.

Develop New Craft

The Inland Waterways Corp., is developing a type of tow boat and barge which may be operated effectively in both nine and six foot channels, obviating the necessity of transfers which have been an added expense to river transportation. General T. Q. Ashburn, president of the corporation, stated recently that the new tow boats are more powerful than the type now in use and have as little draft as possible. On the six-foot channel, 2500 horsepower will be used.

Total ship construction and ship improvement programs undertaken so far amount to about $125,000,000 in cost, and the many pending applications will probably swell this total to about $300,000,000 during the current five-year period.

Late Decisions in Maritime Law

Legal Tips for Shipowners and Officers

Specially Compiled for Marine Review
By Harry Bowne Skillman
Attorney at Law

THE headings of vessels in a winding channel will change with the bends, but their courses are usually disclosed, and, when they are, each must prepare in advance for their headings when they meet. It is the proposed course of the vessels that count, if they are apparent to each other. Where a steamship's signal had not been answered, and she could not in the nature of things know what another steamer proposed to do, the master was bound to stop his way. There is no more important rule, since vessels, though not quite dead, will so reduce their speed that the collision, if it occurs, will be insignificant.—A. H. Bull Steamship Co. v. United States, 34 F. (2d) 614.

* * *

TUGS must keep their tows substantially in line, and if without sufficient power to do this without aid, must secure helper tugs—OVERBROOK, 34 F. (2d) 620.

* * *

WHERE it is undeniable that vessels collided on a clear night in a place where there was plenty of navigable water on either side, and neither vessel made any seasonable and sufficient effort to avoid the other, both will be held to be at fault, precluding recovery of collision damages.—SIDNEY M. HAUPTMAN, 34 F. (2d) 622.

* * *

UNDER the Harter act the shipowner is not liable for any loss by reason of error in navigation or management, provided the owner shall show that the vessel was in all respects seaworthy and properly manned, equipped, and supplied for the voyage; or if this cannot be established, that he has used due diligence to make her so. The discharge of this duty is not left to any presumption in the absence of proof. It is the condition precedent, compliance with which is required of the vessel's owner to give him the benefit of the immunity afforded by the act.—In re Mexican-American Fruit & Steamship Corp., 34 F. (2d) 674.

* * *

WHEN a moving vessel runs into a vessel anchored or moored in a lawful place, the presumptions are all against the moving vessel, and she is presumed to be at fault unless she exonerates herself, The presumptions against her are strong. Practically, her only defense is vis major or inevitable accident; and the latter defense cannot be maintained if she voluntarily put herself in a situation where she receives the effect of the natural forces, the result of which should have been foreseen and might reasonably have been anticipated.—MENDOCINO, 34 F. (2d) 783.

* * *

IN THE case of Allen & Robinson, Ltd., v. Inter-Island Steam Navigation Co., 34 F. (2d) 83, the question involved was whether the master of a crippled ship was negligent in connection with the stranding. Said the court: "The problem confronting him (the master) was a problem of the sea, to be solved in the first instance by seafaring men. We should not view the situation in retrospect or from the shore, but from the viewpoint of the master on the bridge of the crippled ship, charged with full responsibility for her safety and for the safety of her cargo and crew; and, when viewed in that light, we must not only be able to say that the course pursued was wrong, but we must be further able to say that it was so illy considered and so plainly wrong that a competent navigator would have rejected it, if placed in the like position."

* * *

A DECREE for the Almirante Steamship Corp. in a suit against the United States (34 F. (2d) 123) for collision was held justified under evidence that the steamship owned by the latter was traveling without lights to avoid submarines, and that libelant's vessel displayed side lights in time to have avoided collision, had they been observed.

* * *

ONE who furnishes supplies to a vessel, without exercising proper care and diligence required by statute to ascertain whether the charterer had the right to incur a maritime lien, has no lien against the vessel. It was not enough that the furnisher asked to see the vessel's charter; he should have insisted on seeing it.—ROSEWAY, 34 F. (2d) 130.

* * *

A CARRIER'S obligation to a consignee at a port where intense congestion involved protracted delays in delivering shipments, irrespective of whether bills of lading remained in full force or not, was to use reasonable efforts to make an early delivery with such facilities as the port afforded.—American Steel Co. of Cuba v. Transmarine Corp., 36 F. (2d) 246.

* * *

IN THE case of PILOT, 36 F. (2d) 250, it appeared that a licensed fishing vessel had been seized within United States waters while on voyage to Nova Scotia to be delivered to the purchaser while carrying an electric light outfit, radio receiving sets, insulators, an outboard motor, and other small items of cargo which occupied in all only a small part of the vessel's hold, and that the vessel was to have been equipped part of the voyage was not to commence until the vessel left that port. The court held that the vessel was not subject to forfeiture as proceeding on a foreign voyage without first surrendering enrollment and license at the port of departure, nor was it subject to forfeiture as a carrier of a cargo of freight.

* * *

THE sum of $25,000 awarded to a 25-year-old seaman for total loss of hearing in his left ear and partial loss of hearing in his right ear, and for impairment of his nervous system and pain and suffering and impairment of earning capacity, was declared to be excessive, in the case of Lundy v. United States shipping board emergency fleet corporation, 36 F. (2d) 254, and the amount reduced to $17,500.

* * *

FOR purposes of limitation of liability, in valuation of a vessel the commissioner was held in the case of STEEL INVENTOR, 36 F. (2d) 399, to have properly taken into consideration world market as reflected by sales of a similar vessel at the time, rather than book value and reconstruction cost; to have properly refused to allow as deduction from sound value, for insurance, general overhead, and routine repairs; to have properly disallowed deductions claimed by petitioner against total gross freight; and to have properly refused to apportion freight, where it was completely earned and payable on receipts of goods by the shipowner as provided in the bills of lading.

* * *

IN VIEW of the agreement of the crew to remain with an unseaworthy vessel, it was declared by the court in the case of JACOB LUCKENBACH, 36 F. (2d) 381, that a contract between the shipowners and the crew to pay the latter a bonus, and discharge and pay off the crew 48 hours after reaching destination, was valid and enforceable, prior refusal of the crew to remain with the vessel being justified by her unseaworthiness, and the new obligation resting on the new and voluntary assumption of risks for a new consideration.

Leader in Passenger Trade on Great Lakes Retires

ON Aug. 13 A. A. Schantz, president of the Detroit & Cleveland Navigation Co., Detroit, retired after completing 50 years of active service with the company. Although his withdrawal is due to ill health, he will be retained in an advisory capacity as retired president with offices at the foot of Wayne street and at 1344 Free Press building, Detroit, as in the past.

Mr. Schantz's career has been crowded with activity and during his long connection with the Detroit & Cleveland line he has witnessed the development of the company from a $300,000 organization to one of $10,000,000 capitalization.

Arnold A. Schantz

He was born in Galion, O., April 10, 1861, the son of John and Barbara A. (Buckingham) Schantz and moved to Mansfield in 1864. He received his early education in the public schools, night school, and then was tutored privately to enable him to enter Hayesville academy at Hayesville, O.

At the age of 14 he started his career as Mansfield agent of some Cincinnati papers, later becoming a clerk in a general store. At 16 he secured a position as general delivery clerk in the Mansfield post office and one year later was promoted to the office of superintendent of carriers. During his vacation, at the age of 17, he chartered a passenger train over the Erie railroad to operate an excursion to the Soldiers' Home at Dayton, O., and the following year ran a similar excursion to Chippewa Lake, O.

In 1879 he secured the local agency of the Detroit & Cleveland Navigation Co. and during his vacation organized a party and conducted an excursion via the company's line to Mackinac island, repeating the same trip the following year on a larger scale. So marked was his success in this direction that the officials of the line in 1880 tendered him the position of traveling passenger agent, which he accepted. In 1884 he was made general western traveling agent; in 1891, assistant general passenger agent; 1892, general passenger agent, 1902, general superintendent and passenger traffic manager and member of the board of directors; 1907, elected general manager; 1913, vice-president and general manager and in October, 1919, he was elected president and general manager.

During his 50 years of service Mr. Schantz has witnessed many changes and improvements in the company's fleet and has been an untiring worker in the promotion of passenger traffic on the Great Lakes. The latest additions to the Detroit & Cleveland line, the sidewheelers GREATER DETROIT and GREATER BUFFALO, launched in the fall of 1923, are the largest passenger steamers on the Great Lakes and cost approximately $3,500,000 each.

Mr. Schantz is widely known by the title of commodore, having held that position in many organizations by virtue of his popularity and energy in yachting circles.

Among his many business interests are the following: Detroit & Cleveland Navigation Co., Ashley & Dustin Steamer line, Stout D. & C. Air lines, Detroit Marine Aero Engine Co., National Rivers & Harbor congress, Mississippi Valley association, Inland Water Lines association, Great Lakes & St. Lawrence River association, and American Association of Passenger Traffic Managers.

Earns Rapid Promotion in French Line

AT A meeting of the board of directors of the French line held July 29 in Paris, Felix Lachesnez-Heude, general passenger manager of the line in the United States, was appointed assistant general manager of the line for the United States and Canada, succeeding Jean Tillier, who was recently made general manager in place of Pierre de Malglaive, newly-appointed associate managing director of the entire French line organization. No successor to Mr. Lachesnez-Heude as general passenger manager has yet been named, and he will continue in that capacity until Sept. 1.

The rise of Mr. Lachesnez-Heude, who is not yet 40 years old, in the French line has been rapid. He advanced from clerk to his new appointment in little less than 11 years. His association with the French line is logical, his father having served for years as a director of vast French line activities in Marseilles. For several generations his family have been ship owners in Marseilles and Bordeaux. Mr. Lachesnez-Heude was born in Marseilles, Nov. 30, 1890, and served in the artillery for five years during the world war. He won the Medaille Militaire, the Croix de Guerre, and the Medaille Colonaile, as well as the medals of the Moroccan and Italian campaigns.

Felix Lachesnez-Heude

Prominent Seattle Shipping Man Resigns Office

EFFECTIVE Aug. 1, H. F. Alexander, for years an outstanding figure in American shipping, resigned as president of the Pacific Steamship Co. Mr. Alexander has opened a suite of offices in Seattle for the purpose of looking after his private business interests. Among them are extensive oil holdings. He will continue to sit on the board of directors of the Pacific Steamship Co. and thus maintain his association with shipping.

For 30 years Mr. Alexander, still in his prime, has been actively identified with shipping projects on the Pacific coast. Beginning in longshore work, he later managed a deep sea terminal and then organized the Pacific Alaska Navigation and allied corporations which soon established services as far north as Nome and south to the Mexican line. In 1916 his company absorbed the old established Pacific Coast Steamship Co., the combined fleets being merged into the Pacific Steamship Co. In 1918-19 this company established the first American flag service to the Orient from Puget Sound in many years. Since 1922 the Pacific Steamship Co. has been engaged exclusively in the coasting business. Its outstanding unit, known to travelers from all parts of the world, is the fast liner H. F. ALEXANDER, formerly the GREAT NORTHERN.

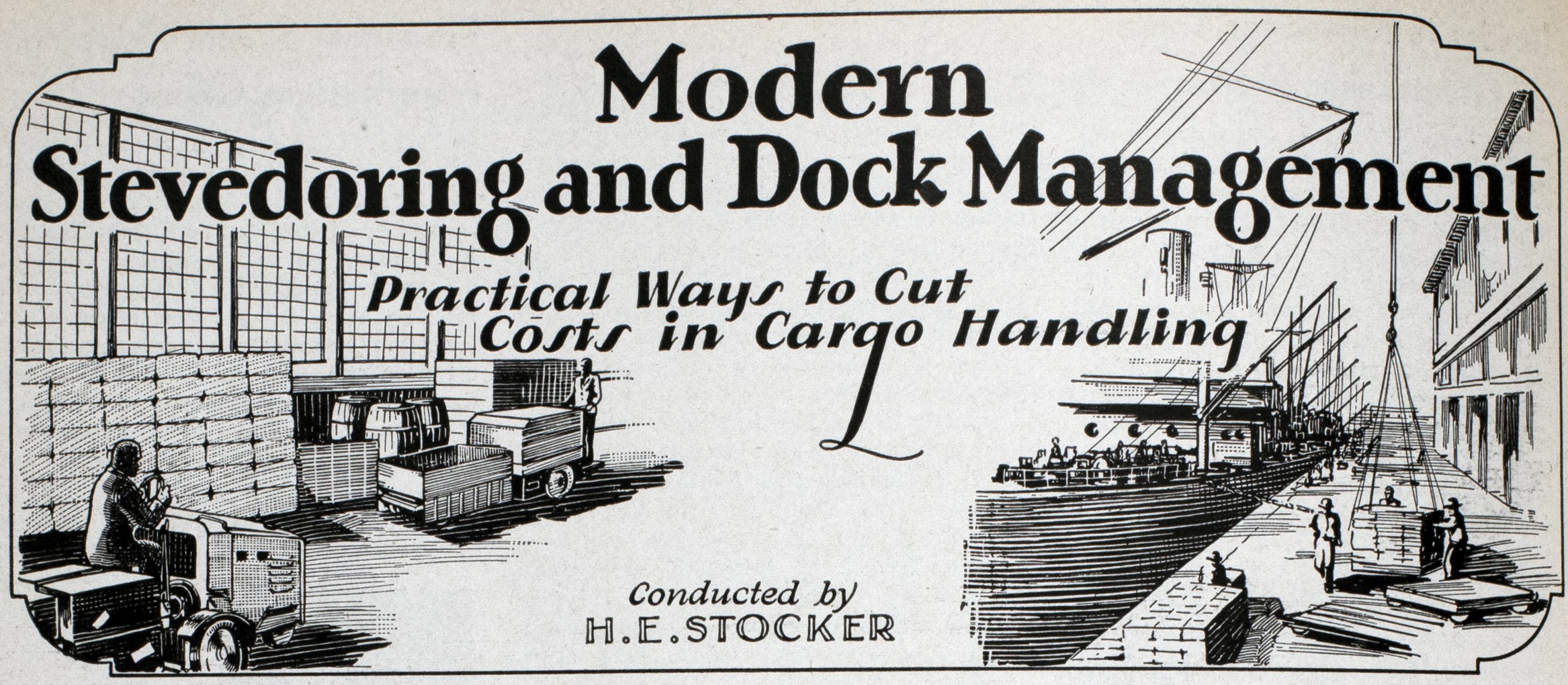
H. F. Alexander

Mr. Alexander's successor as president of the Pacific Steamship Co. has not been announced.

Mr. Eugene F. Hord, recently appointed executive vice president of the Fireman's Fund Indemnity Co. arrived in San Francisco on Aug. 18 to confer with head office officials in connection with the company's entrance into the casualty field on a nation-wide basis.

As executive vice president, Mr. Hord will have jurisdiction over the company's business east of the Rocky mountains, with offices in New York. He will remain about a month in San Francisco.

M. J. West, dockmaster of the Newport News Shipbuilding & Dry Dock Co., Newport News, Va., since 1892, died on July 22 in Riverside hospital, Newport News, after a short illness. He was 74 years old and was widely known among ship builders and ship masters owing to his long connection with the company.



Modern Stevedoring and Dock Management

Practical Ways to Cut Costs in Cargo Handling

Conducted by
H. E. STOCKER

Use Good Lighting on Piers and Docks to Reduce Cost of Operation

By R. G. Morison

WHILE artificial illumination is far from a new development, it has only been within recent years that it has had such an important bearing on human welfare and progress.

In the incandescent electric lamp and suitable accessories we have available a reliable substitute for daylight and can carry on our activities without interference from darkness or cloudy weather. With modern methods of ilumination it is possible to accomplish suitable working levels of lighting much more economically than in the past.

Proper lighting favorably affects production and handling of materials. When lighting is wisely applied, materials can be produced and handled in a cheaper, more efficient, and safer manner, which means a lower unit cost.

Fundamentals of Good Lighting

In the present day incandescent lamp we have a source of light that in low first cost, economy of operation, volume, color value and steadiness of light emitted, is a marvel of scientific and mechanical progress. A bare lamp, however, could not, by itself be satisfactorily employed. The lamp must be so shielded that little or no direct light will come to the eye of the worker and a maximum amount of light will be directed to the working area. A reflector is essential to the proper direction of light, and upon the proper choice of the reflector, its mounting height and spacing, will depend the success of a lighting installation.

Summing it up, the fundamentals of an effective lighting system are: Adequacy of light for the work; freedom from both direct and reflected glare; units so located as to eliminate harsh shadows and sharp contrasts; a fair degree of illumination on side-walls and ceilings; the lighting system should be simple.

In lighting active working areas the watts per square foot should not be less than 1½; in storage areas 0.5 to 0.75 watt per square foot is usually considered good practice. Proper distribution depends on the mounting height of the lighting equipment which is usually governed by the ceiling height or truss construction of the building.

The two types of lighting equipment most commonly employed in industrial buildings today are the R. L. M. dome and the Glassteel diffuser. Of these the latter gives the softer more diffused light with greater freedom from shadows. For the majority of installations it is economical to install reflectors of a size which employ the mogul socket and which will, therefore, accommodate 300 and 500-watt lamps. The correct burning position for 200-watt lamps may be secured by using a mogul medium base socket adapter. This scheme permits flexibility and convenience in obtaining adequate levels of lighting in practically any area.

Lighting of Docks and Piers

Weakening of any link in the transportation system impairs the entire industrial organization. If terminals become congested, if railroads or steamship lines fail to handle raw material with dispatch the producer suffers. Adequate lighting facilitates the movement of material and proper illumination of warehouses and piers. thus indirectly increases and expedites production.

Speeding of shipment by good lighting is increased through the following direct causes: Greater actual speed of trucking, handling, etc.,

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The author, R. G. Morison, is illuminating engineer, Edison Lamp Works of the General Electric Co.

ADEQUATE lighting will give an increase in production. Lighting has a distinct bearing on safety and enough of the right kind of lighting is a definite help in preventing accidents. Proper lighting decreases the labor turnover and it is a factor in maintaining the health and morals of employes. Adequate lighting also reduces spoilage. It is for the above reasons that the subject of lighting should have the serious attention of steamship owners and dock operators.

markings more easily read. While the indirect effects are: Less misdeliveries; reduction of spoilage and thefts; improved relations with shippers. These are not theoretical statements, but are borne out in practice.

If a pier or warehouse is dimly lighted, many portions in deep shadow, truckers must proceed cautiously, watching out for objects lying about on the floor, for they lack the confidence which comes with clear vision. Accident reports reveal that one of the most common causes is stumbling or falling. With poor lighting this hazard is increased. Not only does an accident affect the injured worker, but it has a demoralizing effect on the entire force. Each workman becomes overcautious and slows down his movements. Proper light, therefore, increases the speed of handling.

Lighting Expedites Stowage

In sorting packages or stowing them aboard ship, it is, of course, necessary to read and check the marks. It is evident that with plenty of light, less time will be spent on this step of the handling. In many buildings there are only a few spots where there is enough illumination to read marks, and material actually has to be moved to be sorted. Certainly this extra handling is not efficient.

Another serious trouble is misdelivered shipments. Inadequate illumination is an important contributing cause. The reading matter on way bills is often faint or blurred and many packages are badly addressed. The chances for error under poor light are great. Packages sent to the wrong place sometimes never return. Perishable freight is often entirely lost if misdelivered.

Spoilage of goods is reduced if there are no dark corners in which packages of perishable material become hidden. Again, boxes that have been broken in shipment are readily caught and taken care of before a greater loss is sustained. Breakage is bound to be reduced, for employees will not throw articles about promiscuously if the place is well enough lighted so that they are likely to be seen. Theft is greatly reduced, as the sneak thief would not dare to pry open a bundle and remove part of the goods in a bright well lighted spot.

Modern business methods have made it important to please the public. Common carriers desire to have the most cordial relation with shippers. If consignments are delivered promptly in undamaged condition, if mis-delivery of shipments is eliminated, the transportation agent will have the good will of the shipper.

Investigation has been made of a number of marine terminals and reveals that in general, the standards of illumination are far too low for most economic operation. Not only is insufficient light furnished, but in a great majority of cases antiquated equipment is employed. Obsolete types of incandescent lamps, inefficient carbon lamps and open flame gas burners are more prevalent than in almost any other field. Even where efficient lamps are employed, frequently light is wasted through the absence of proper reflectors. In many cases where reflectors are installed, they have not been well maintained, becoming dirty, rusted and in some cases, actually falling apart. Incandescent lamps are allowed to burn after becoming badly blackened.

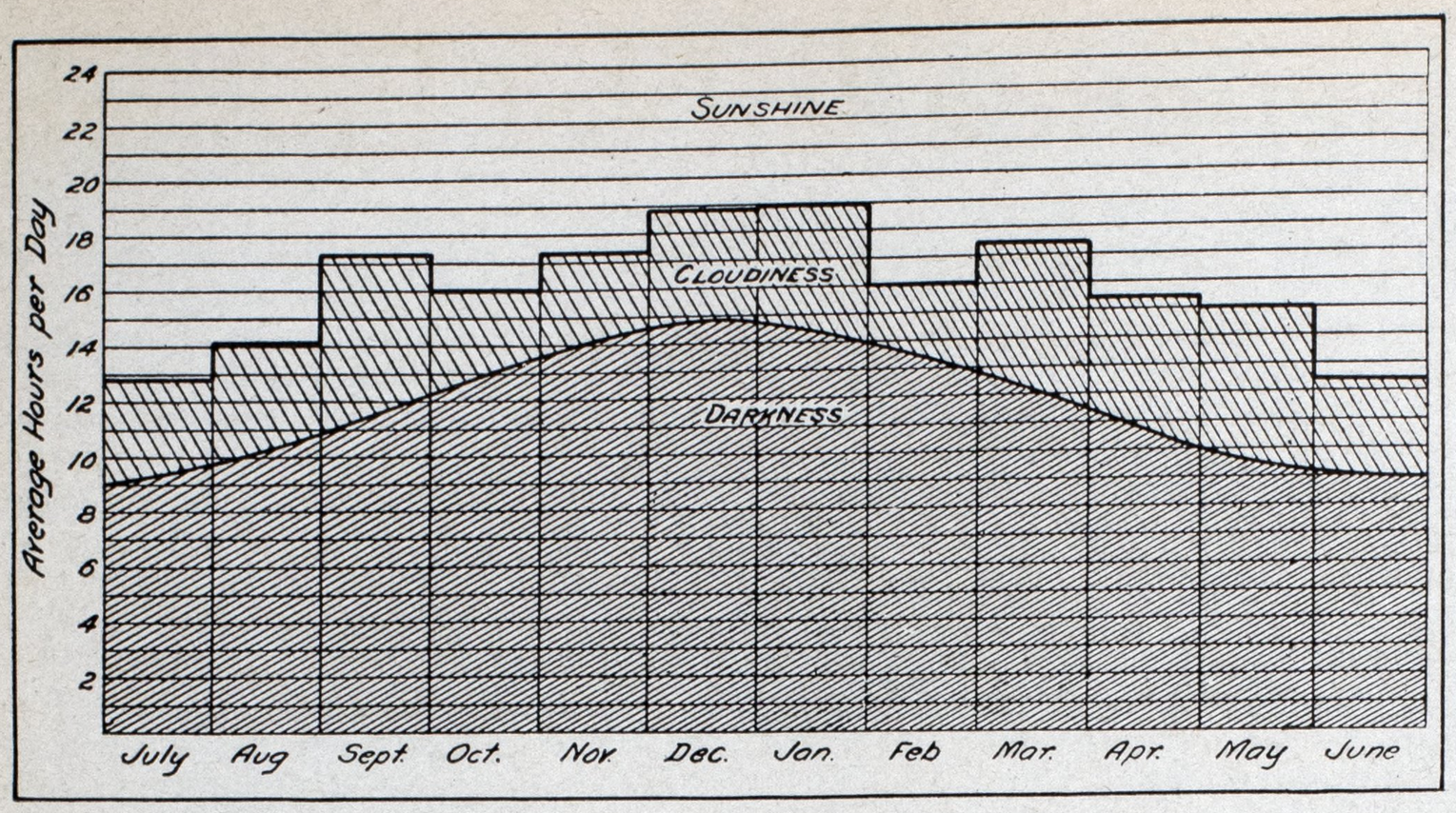
It is apparent that the effect of light-colored surroundings in increasing the illumination is not fully realized. Ceilings and walls have been allowed to become almost black, reflecting practically no light. A little white paint will save a great deal on the lighting bill and allow increased utilization of daylight.

General Lighting Requirements

In general freight interiors can be well illuminated by three rows of units lengthwise of the building with 500 watt lamps on 50 foot centers down the central trucking area and on 25 foot centers in the side loading bays. In most instances reflectors should be hung as high as possible. Properly applied, this does not reduce the area of intensity of illumination in spite of the popular misconception to the contrary. Lamps well up toward the ceiling are not so likely to be broken, they are handled less, and reflectors do not become so dirty. Light sources hung low or in the line of vision causes glare, and deep elongated shadows.

The usual practice for the illumination of loading platforms is the use of R. L. M. reflectors on brackets or pipe goose necks fastened to the building. An average of one watt per square foot should provide adequate intensity. Floodlighting can also be used to advantage when equipment can be mounted 30 to 50 feet above the working area and

Daytime View of Warehouse Lighted by 200 Watt Glassteel Diffusers on 16 Foot Centers



Proportion of Day Spent in Darkness or Semi Darkness

properly directed so as to reduce glare to a minimum.

On passenger decks of the pier, more attention should be given to the appearance of the unit. Most people who travel by boat for business or pleasure, are of a class which are accustomed to the comforts resultant from good illumination. The patronage of this class of people is most desirable in normal times and a well lighted pier is a factor toward this end. With good lighting the inspection of baggage by custom officers is facilitated, thus easing one of the greatest inconveniences of ocean travel.

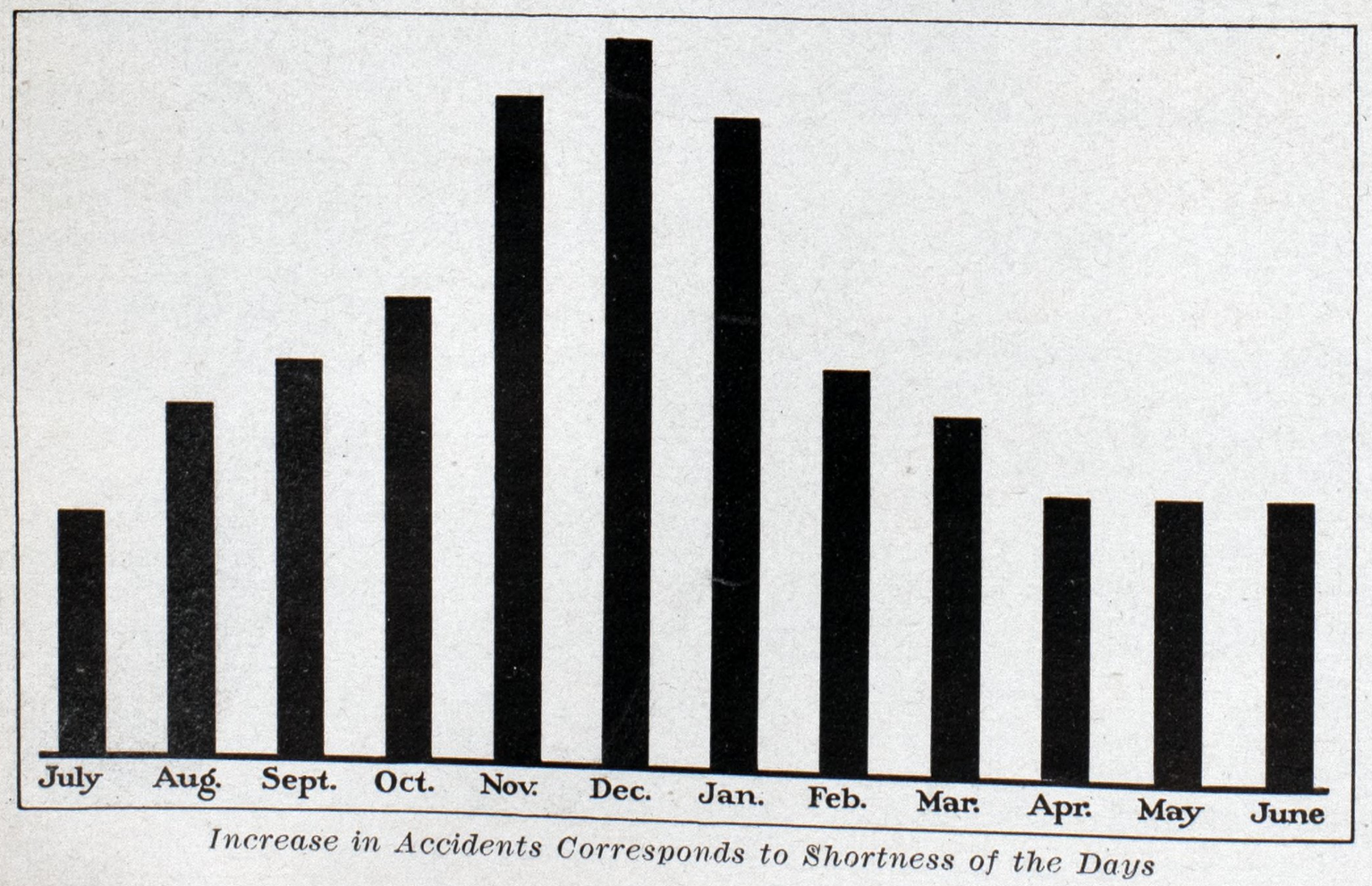
Traffic in the neighborhood of a busy pier is heavy. To avoid confusion and resultant delay of trucking, the approaches to a busy pier should have somewhat better lighting than normally furnished by the municipal street lamps. Standards are out of the question, as they are very likely to be broken by a truck. Brackets suspended from the face of the building provide the logical solution. Standard street lighting equipments of the various types, with their particular advantages, should be used here.

A completely equipped pier should have high power floodlight lamps on the water side of the structure. These should be hung so that the open hatchways of the ships can be lighted. This facilitates freight handling and tends to eliminate accidents. The actual lighting of the hatchway itself is taken care of by portable lamps, which are part of the ship's equipment.

What Lighting May Cost You

While it is obvious that good lighting is more expensive than poor lighting, experience has proved that it is a sound and worth while investment. In one plant which installed lighting equipment sufficient to provide illumination of a high order a saving in spoilage on one operation amounted to $30,000 a year. This saving was credited directly to lighting because the only change instituted that could produce such a saving was the improvement of the illumination.

From figures compiled by the Edison Lamp works if each workman in the average industrial operation saves less than two minutes a day or the rate of production increases 1/3 of one per cent new lighting will pay for itself. Good lighting is not an expense—it is an investment which pays handsome dividends.



Increase in Accidents Corresponds to Shortness of the Days

Good Lubrication of Trailers as an Aid to Efficiency

A MAN with years of experience in the use of materials handling equipment, in response to our request for his ideas on lubricating trailers, writes as follows:

The value of lubrication lies entirely in the fact that grease or oil forms a film between two metal surfaces which prevents them from coming in contact with each other. It is a well known fact that when this film becomes too thin lubrication ceases.

There are three reasons why this might be brought about—

1. The lubricating material might disappear entirely.
2. The lubricating elements or oils in the lubricants might be used up so that the film is destroyed.
3. The pressure between two revolving surfaces might be so great that the film is crushed and thus destroyed.

The first reason is usually due to carelessness, and you can easily understand how, with the old method of squirting oil on the outside of a wheel with the idea that it would work into the bearings would not be efficient. Dirt might prevent the oil from reaching the important surfaces. It is for this reason that we have adopted the Alemite and Dot systems of greasing bearings. By these methods the grease is forced from the inside out, in that way not only assuring contact of the grease with the metal, but forcing old grease out and supplying new grease in its place.

Don't Use Too Long

The second reason usually results because lubricant has been used continuously over a long period of time, and not been replaced when worn out. The period of replacement naturally depends upon the work which the bearing has to do. In the case of trailers which are moved by hand, I have found that a thorough greasing once in sixty days supplies the need.

In the case of trailers which are moved with a tractor on an ordinary interior freight house operation, where freight is left standing on trailers and where the trailers may not move over a mile a week, all told, a thorough lubrication once in thirty days should be sufficient. On a steamship operation, however, where trailers are serving hatches and where the turnover is repeated I would recommend the greasing of trailers about every two weeks.

Just a word regarding the third

(*Continued on Page* 54)

Individual Experience Is Not Enough

It Is Too Limited in Scope to Obtain Maximum Results —Should Adapt Methods Successfully Used by Others

By H. E. Stocker

EXPERIENCE is necessary to achieve success in any business or profession, but what is experience? Is it not an accumulation of facts and ideas? Is your experience as large as the accumulated facts and ideas of everyone in the business? What are you doing toward enlarging your experience?

Everyone is influenced by the experience of others but it is a fact that too many executives and men in other important capacities resist the influx of facts from the experience of other men and organizations. A new conception, however, is gaining ground rapidly. This conception is that there is one best way to do everything under any given condition and that the one best way connot be determined unless the sources of information are numerous, unless facts are obtained not from one's own experiences and that of his neighbors alone, but from the experience of others the world over.

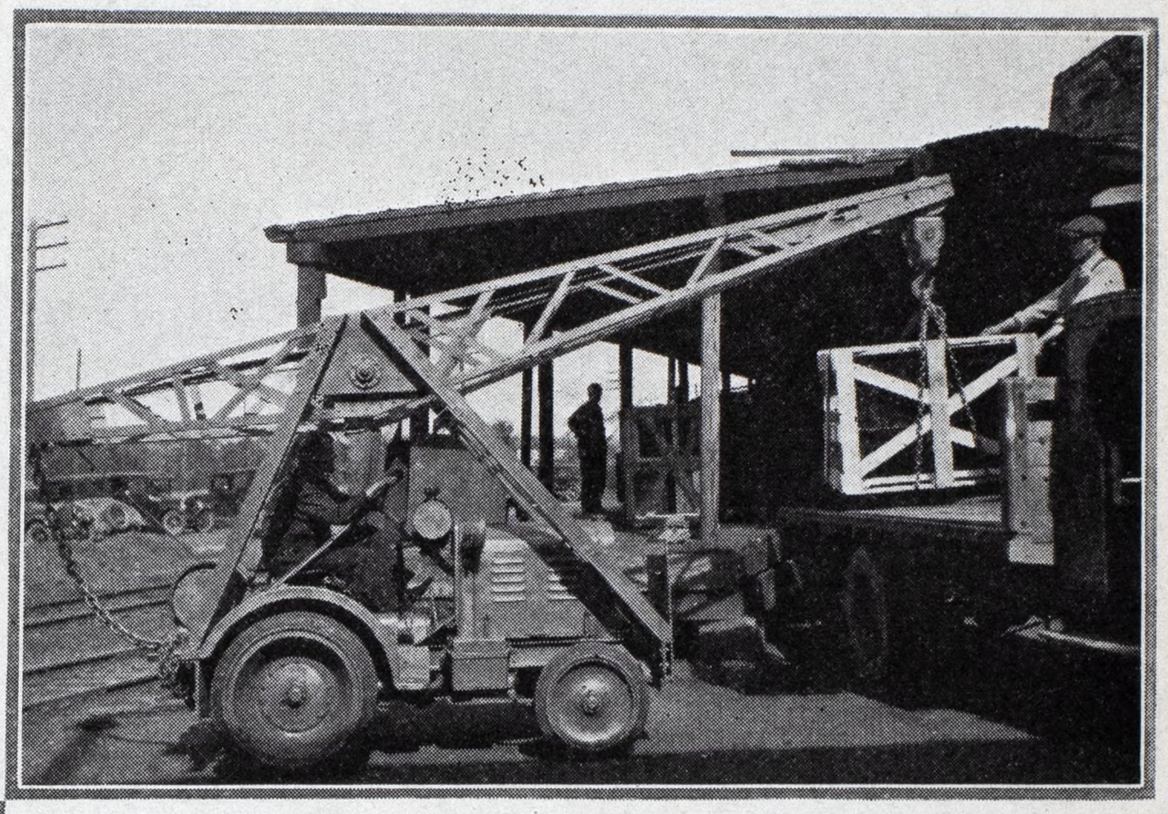
Many an important decision has been made and has been proved wrong because the available facts had not been obtained before arriving at it.

The willingness to dig out facts and secondly, the willingness to face the facts are characteristic of the men who have accomplished the most in American industry. It is the very essence of scientific management one of the principles of which is "the systematic use of recorded experience."

Reverence for one's own ideas and experience is probably the chief hindrance to the greater acceleration of industrial progress. "Everyone has a right to his own opinions" only when his opinions are based on facts. Realizing this, great leaders in military, political and business affairs are noted for their contacts with wide sources of information. J. George Frederick in *Business Research and Statistics* brings this out in connection with Napoleon:

". . . his significant trait of eager and determined search after information; his personal interest in details of information down to inquiry into the very quality of the soldiers' mess before going into action, by personally tasting the food in some random field kitchen; and then, once having coordinated all his information into a plan of action, making a special point of carrying it out *with great swiftness.*"

This being true, one of the most important steps to be taken in an organization is providing the machinery for collecting facts. Usually the vice presidents, the general managers and the terminal superintendents are too busy getting ships out on schedule and attending all the other details necessary to keep a business going, to have the time or energy to study their own operations, let alone dig out facts from the operations of others. Also, many very competent executives do not have analytical minds, a necessary requisite for getting the most out of the facts obtained. For this reason staff men in the organization or consultants are employed. These men have the necessary time to get the facts, determine their significance by analysis and to develop new facilities and methods which they put into effect by working with members of the organization.



Using a Movable Gasoline Crane for Unloading Trucks and Freight Car

Using an Electric Chisel Truck to Good Advantage in Handling Bales on Pier at Seattle

Further fact getting machinery is provided in some organizations by organized research and development departments. This work is performed by a regular department in the organization or by government bureaus, colleges or co-operative associations, or by all of these. A large company like the American Telephone & Telegraph Co. can afford to employ 4000 men in its research department laboratories. Many smaller companies have small research laboratories, but most small organizations must co-operate with the established research facilities.

Research Work That Pays

Research work is divided into two parts, that which is expected to develop immediate commercial results, and that which is pure scientific research, commercial results being a gamble in so far as any particular line of work is concerned, but sure so far as the whole effort is concerned. History proves that pure

scientific research really does pay.

The trade press is another valuable source of information. A good share of the great improvement in industrial methods in this country has been due to the collection of facts by the trade press and the stimulation of thought and activity resulting. The greater the progress of any industry, the greater has been the use of the trade press.

The Best Way of Handling Boxed Automobiles Can be Determined Only by Having Information from Many Sources

Associations and engineering societies are also important sources of facts because of the interchange of information and ideas by means of papers, discussions and joint trips to plants that have developed better facilities and methods.

Salesmen of equipment manufacturers constitute a further source of much profitable information. The best of these are almost invaluable because of their wide experience and ability to get facts.

A very important source of facts and ideas is the personnel of the organization itself, from the highest down to the least important member. This vast source of experience remains almost untouched because of a lack of realization of its great value, or because of failure to understand the means by which this source of many profitable facts may be effectively utilized. It is important to obtain the benefit of the workman's unique advantages for getting facts about the details of the work and for forming judgments based on these facts. In a large organization particularly, executives have not the time nor sufficient assistants to dig out this information.

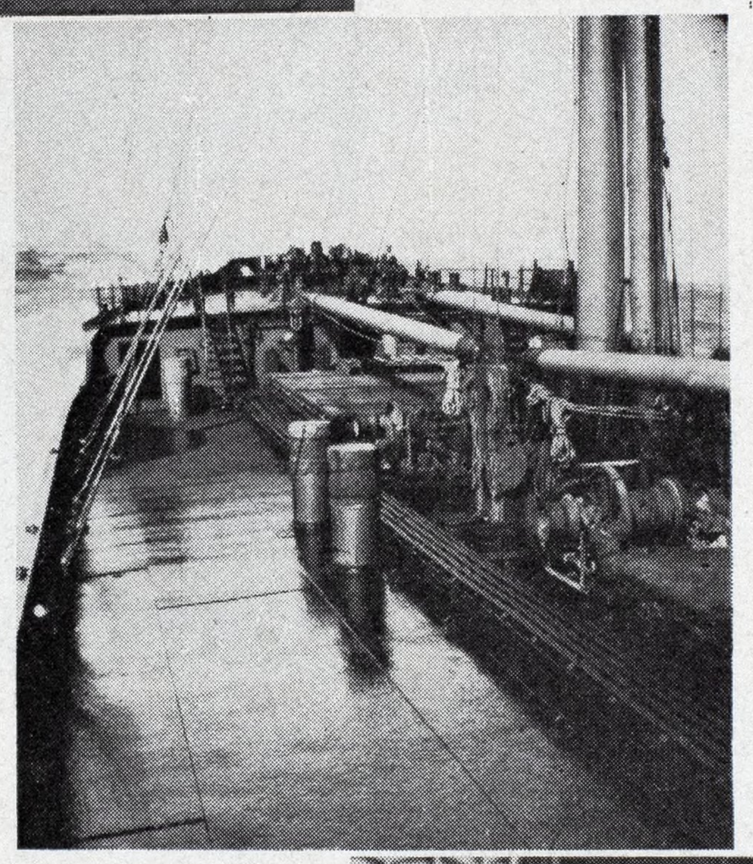
However, this has been accomplished in the best managed organizations by the combination of authority with responsibility, incentives of money and other character and the square deal.

Bosses who get insulted when suggestions and information are offered from within the organization are hindering the utilization of this important source of information. In Mr. Ferguson's article in the August issue of MARINE REVIEW, the value of stimulating suggestions by suggestion campaigns with suitable rewards, etc., was emphasized as a practical measure.

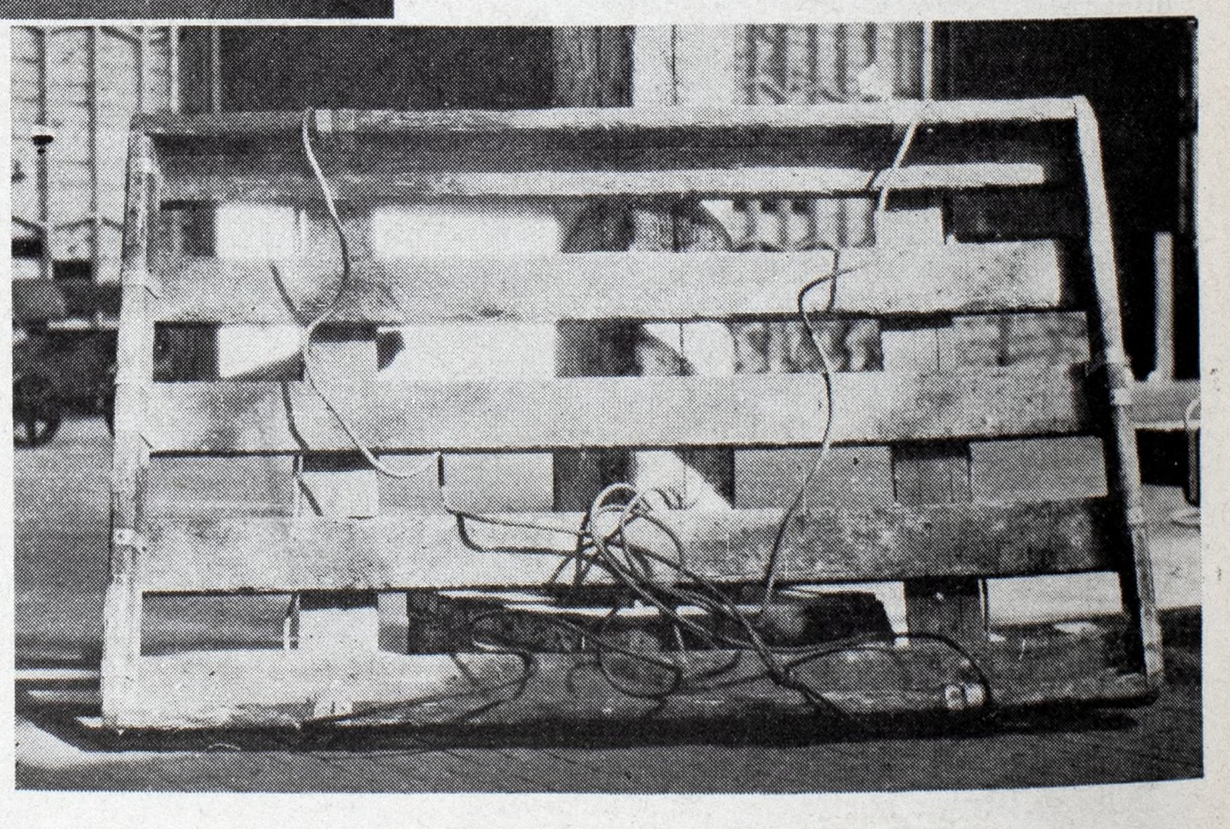
Forcing decisions upon subordinates often results in performing work in the wrong way. If the subordinate attempts to prove that the decision is not in accord with the facts, he is firmly and many times not too politely, put in his place. This is distinctly bad management. It is not in accord with the facts of management as developed by scientific management. One of the fundamental principles of scientific management is the recognition of the principles of human relations. The mental attitude of the worker toward his boss and working conditions is probably the most important single factor governing the employee's efficiency.

Finally, because many facts and ideas escape one if memory is depended upon, it is important that the facts and ideas collected be recorded in proper form. Properly designed records make more facts and ideas available for future use and make them more easily available for the use of others.

The organization or the man with the best records has the best experience on which to base success.



Research is Needed to Develop a System of Ventilating Ships' Holds That Works in Bad Weather as Well as in Good



Broader Experience Might Point to a Better Type of Sling

Lubrication of Trailers

(*Continued from Page* 52)

reason mentioned above, and I believe this can be best illustrated by the difference between a spur gear drive and a worm gear drive. In the case of the spur contact between the gears is of a rolling nature where there is not so much continuous pressure on any one point, whereas with a worm gear the pressure is not only of a rolling nature, but also of a thrust nature and you can readily recognize that unless the worm is kept carefully lubricated, the frictional resistance soon begins to tell in decreased efficiency and harder working parts. This of course does not apply to trailers.

In applying grease, I like to recommend a pressure gun which sells for $75, and where there is a fleet of say 50 or more trailers, it pays to have this kind of a gun. The kind of grease will have to vary somewhat with the temperature, a hard grease being less effective in the winter, but general all round use, we like to recommend a medium grade of good cup grease which would have enough body so that it would be possible to force it into the lubricating system without its melting to oil in the process.

New Terminal Opens

Aug. 1 the Luckenbach Steamship Co. Inc., opened their new eastbound terminal at the Port of Seattle's new Salmon warehouses, Pier 40.

This is probably the most ideal terminal for the intercoastal trade. It is by far the largest in the country, with a berthing space of over a mile, the exact footage being 5810 feet. There is 3239 feet alongside storage sheds.

Useful Hints on Cargo Handling

A COASTWISE line discharges rolls of newsprint paper with ships booms to a staging which has a slight inclination toward the dock. The rolls drop down this slope to a trailer and are then hauled away. Rolls of newsprint can be discharged rapidly like this without damage.

Another coastwise line gets rolls of newsprint on to trailers by a different method. A steel half round shell is put underneath the roll by tipping roll slightly. This is moved to trailer with a two wheel hand truck. The shell is then pushed against the trailer, a small steel projection on the shell catches the floor of the trailer and prevents the shell from slipping.

Still another method of loading heavy pieces of cargo on trailers is employed by a railroad company stores department. The trailers used have normal sized wheels and a low slung platform with slides that may be dropped down to serve as aprons. This facilitates loading heavy pieces, barrels, etc.

Side ports can be worked safely in any weather by covering gang plank with a canvas tunnel. This is a distinct advantage as compared with handling cargo overall.

Stevedores piled canned goods on pier with all marks one way. This facilitated deliveries and reduced mistakes. Instead of decreasing tons handled per hour, efficiency was actually increased.

Stowing to Avoid Odors

THE characteristic odors of oakum tar, rope and twine are liable to taint other cargo. These commodities must under no circumstances be stowed with foodstuffs, and they should be stowed underneath goods liable to damage by stain.

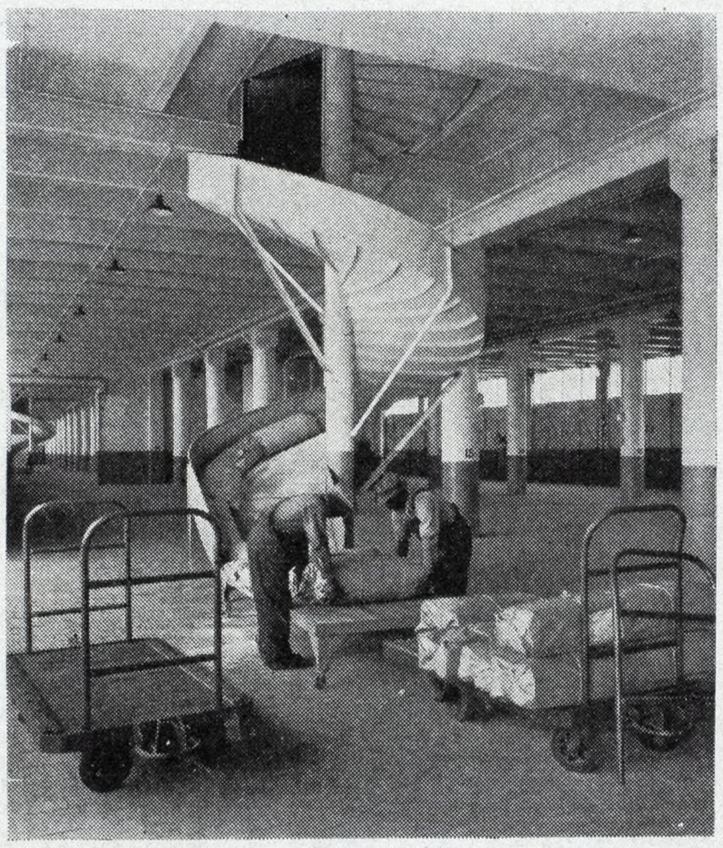
The high temperature and the moisture prevailing in the holds while the ship is passing through the tropics is liable to liberate oil or tar.

One shipment of rope was damaged by being stowed near the boiler room bulkhead. The heat caused the rope to deteriorate and a claim resulted.

Portable Elevator Piling Hogsheads of Tobacco

THIS page is to be devoted to short items on all matters having to do with the more efficient turnaround of ships. These items are intended to be of a helpful nature.

We will welcome for this page brief descriptions, illustrated if possible, of any better or safer way of performing any function in cargo handling. Also, any questions submitted will be answered by the editor.



Landing Platform Attached to Chute

Longshoremen voluntarily increased slingload when using truck 14 inches high in place of truck 22 inches high. It was found easier to lift steel sheets from floor to the lower truck.

Unloading Steel Sheets

IN a recent issue of *Steel*, handling of steel sheets in unit bundles is described as follows:

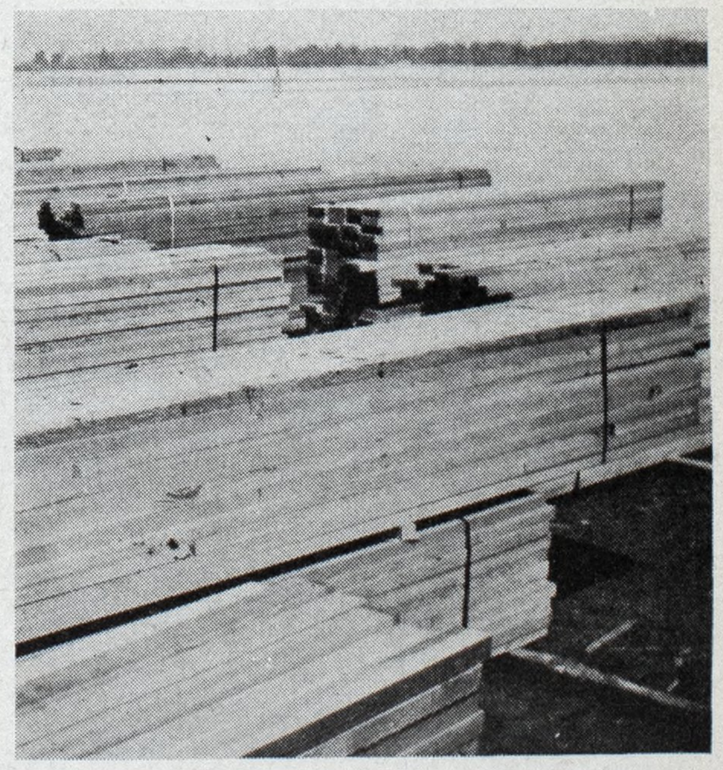
A system, which uses a fork truck and two tractors, has reduced the cost of unloading steel from car and stacking in storage to less than 2 cents a ton with a haul between car and storage averaging 300 feet. Stock shorter than 96 inches and in widths up to 30 inches is placed in cars, bound by wire or steel bands, each package of 8000 pounds resting on short 4- x 4-inch blocks placed longitudinally within the car. This is yet another example of how the high cost of handling is being reduced. The problem of handling steel is essentially the same and is solved in the same way in all industries. One way to greater profits in shipping is to cut down all picking up and putting down of cargo that is seen so generally.

A heavy-duty dolly is manufactured ranging in capacity from 2000 to 5000 pounds. The width under the channel flanges is 6½ inches, the length of the dolly bed is 12 inches and the overall width is 14 inches. The wheels are 6 inches in diameter. The bearings are either plain or Hyatt roller bearings, depending on the service to which the dolly is to be put.

This dolly has proved very useful where machinery, structural steel or heavy cases are to be moved.

Use Unit Loads of Lumber

RECENTLY the Charles R. McCormick Lumber Co. had to deliver 150,000 feet of dimension stock to a port on the west cast of Mexico, where ordinary method was to discharge to lighters. Since this involved double handling, the idea of shipping in unit loads strapped together with galvanized steel bands was carried out. By this means the unit to be handled was changed from single pieces of lumber to unit loads containing a large number of pieces. The shipment was stowed on deck. When the steamer arrived off the port, the unit loads were dropped in the water with ships gear and towed ashore.



Unit Loads of Lumber Iron Strapped

Patents Show Marine Development

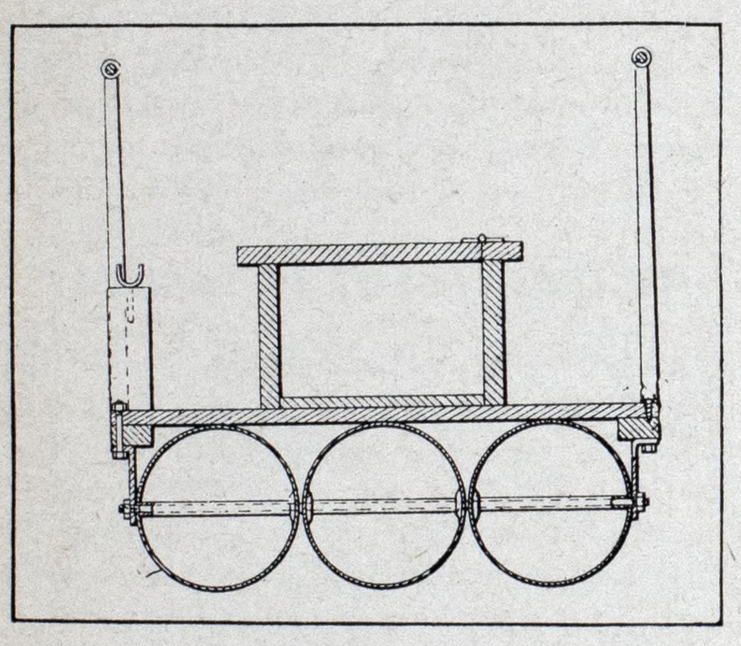
Latest Marine Inventions Described

Specially Prepared for Marine Review

By Richards and Geier

Patent Attorneys, 274 Madison Avenue, New York

THE object of the invention is to provide a construction for lifeboats, speed boats, pleasure boats, or rafts in which buoyant members which are designed to be in the form of tubes, are effectively braced transversely and united by transverse assembling means which effectively secure them together; to provide a construction in a device of this kind in which the platform is supported from the transverse assembling members; to provide a construction in which the platform is equipped with a longitudinally extending seat for the accommodation of the occupants; and to provide a construction which is generally of simple character, so as to be susceptible of cheap manufacture and low marketing cost.



BOAT

United States patent No. 1,762,451, issued June 10, 1930, to Daniel F. Murphy, of Galveston, Texas.

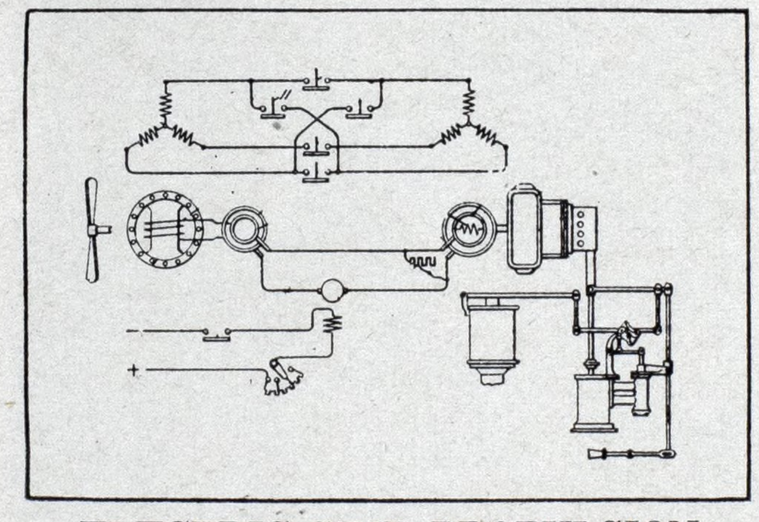
THIS invention relates to meridian-seeking gyroscopic compasses. The instrument is so constructed that the degrees of freedom of its gyroscopic element, about two mutually perpendicular supporting axes, may be suppressed in order to cause the element to follow the movement of the craft over the surface of the earth and maintain its normal relation to this surface independently of latitude. By virtue of this construction the effect upon the element of acceleration and retardation pressures due to changes in speed of the craft will be automatically taken care of, and such corrections as may be necessary to meet new conditions of speed can be easily applied.

GYROSCOPE COMPASS

United States patent No. 1,701,283, issued Feb. 5, 1929, to Harry L. Tanner, of Brooklyn, New York.

THIS invention relates to electric power systems and more particularly to systems for electric ship propulsion.

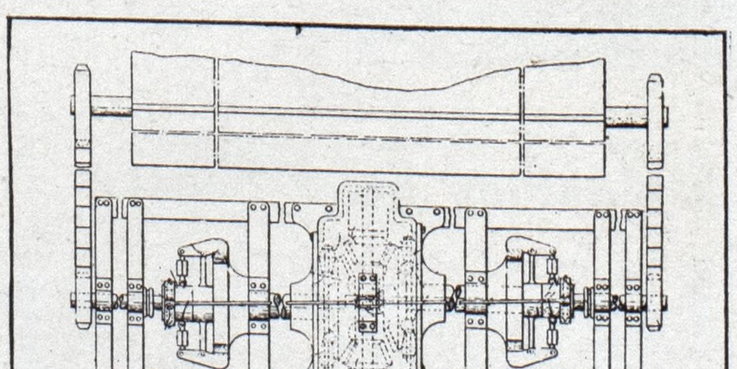
An object of the invention is to provide a system of electric propulsion which will be reliable and efficient in operation and which will extend the advantages of electric propulsion to low speed boats such as cargo boats and the like.



ELECTRIC SHIP PROPULSION

United States patent No. 1,701,350, issued Feb. 5, 1929, to Ernst F. W. Alexanderson, of Schenectady, New York.

THIS invention relates broadly to boat drives, and more particularly to an improved mechanism for actuating the propelling means of a boat. It relates still more particularly to a driving mechanism for a boat having a propeller shaft adapted to be driven from more than one point, such as at or near its opposite ends, the propeller lying between the driven points on the shaft. An example of this type of drive is to be found in the common stern wheel boat such as is used in river navigation.

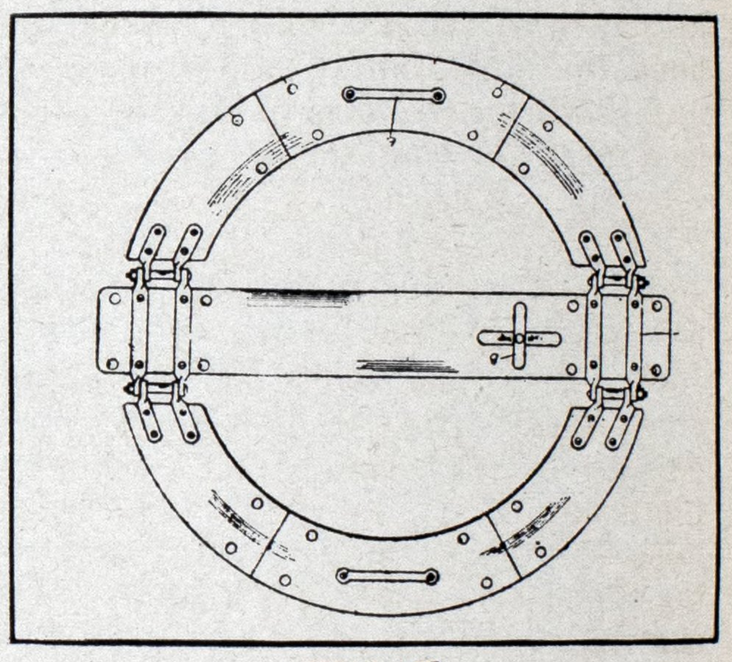


BOAT DRIVE

United States patent No. 1,761,373, issued June 3, 1930, to Charles H. Tegmeyer, of St. Louis, Missouri.

THIS invention relates to improvement in indicators for wrecked submerged craft, and it consists in the combinations, constructions, and arrangements hereinafter described and claimed.

An object of the invention is to provide an indicator for wrecked submerged crafts, such as airplanes, submarines, boats, etc., in which a novel pressure actuated release is used for freeing a buoy when the craft sinks to a predetermined depth.

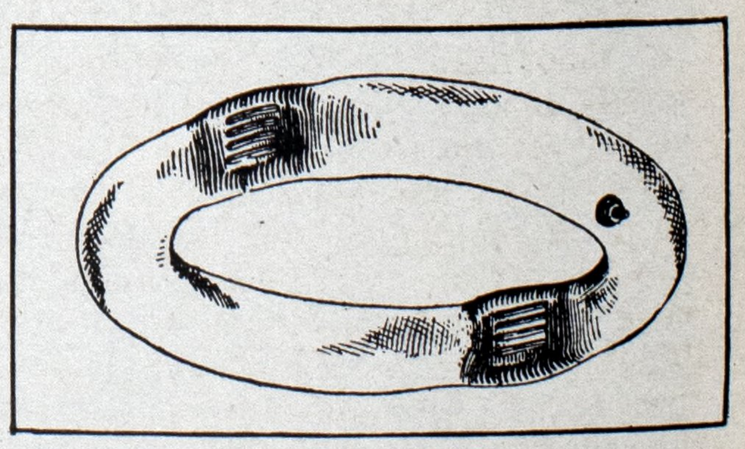


FLOAT

United States patent No. 1,761,680, issued June 3, 1930, to William E. Rawlings, of San Jose, Calif.

THE present invention relates to life belts and is particularly directed to a life belt of special construction and features adapting it to fit the human body, and particularly to fit it comfortably under the arms.

The principal object of the invention is to provide a life belt of this character with front and rear inflatable portions both inflatable through a single valve located in the front portion, both portions being connected by a part of the belt of decreased thickness and increased flexibility.



LIFE BELT

United States patent No. 1,704,975, issued March 12, 1929, to John Francis Kennedy, of Baltimore, Maryland.

Intercoastal Ship Operators Meet with Board

Representatives of steamship lines operating in the intercoastal trade of the United States, who met with the shipping board Aug. 6 in an effort to devise ways and means of composing their differences, voted to hold further meetings and report back to the board when they have developed a concrete plan of action.

The meeting was called by the shipping board as a result of continued unsatisfactory conditions which have existed in the intercoastal trade. Both conference and nonconference lines were represented, the board desiring to bring all interested parties together on a mutually beneficial basis for future operation. In speaking of the purposes for which the meeting had been called, Chairman T. V. O'Connor pointed out that the board has no legal control over domestic shipping such as that exercised by the interstate commerce commission over railroads, but suggested that legislation to bring such regulation about might be considered as one solution of the present difficulties. He expressed the hope that the lines would make this unnecessary by finding a way to regulate the trade themselves.

At the close of the morning session, Chairman O'Connor suggested the appointment of a committee which would be representative of the board the conference lines and the nonconference lines. The board members appointed to this committee were Vice Chairman E. C. Plummer, and Commissioner R. K. Smith, who met during the afternoon with R. C. Thackara, chairman of the intercoastal conference, and other members of the intercoastal conference as follows: W. F. Taylor, Nelson line; J. D. Tomlinson, American-Hawaiian line; Edgar F. Luckenbach, Luckenbach line and C. B. Kellog, Munson lines. The nonconference lines representation was composed of the following: John W. Chapman, Dimon Steamship Corp.; John McAuliffe, Isthmian line; W. H. Hoskin, Panama-Pacific line; H. W. Warley, Calmar line; Arthur R. Fallon, Union Sulphur Co.; V. P. Shepard, Shepard Steamship Co., and Theodore Brent, Redwood line, Inc.

Port and Terminal Fees

A supplement to Miscellaneous Series Report No. 1, entitled *Port and Terminal Charges at United States Ports*, has been issued by the board of engineers for rivers and harbors of the war department in cooperation with the United States shipping board. This supplement gives the more important corrections and additions to the data contained in the original volume, bringing all information up to date as of January 1, 1930. The volume gives information relative to the services and charges of the United States government and local port authorities which are applicable to vessels, freight and passengers at United States ports.

Copies may be obtained from the superintendent of documents, Government printing office, Washington, D. C., at $1.00 per copy for the original volume and 20 cents per copy for the supplement.

Great Fuel Economy Shown by Canadian Pacific Liner

During her recent homeward run from Quebec to Southampton and just prior to her departure from Southampton for the Pacific, where she will be operated in the Vancouver-Hong Kong service, the Canadian Pacific liner EMPTESS OF JAPAN showed a remarkable increase in fuel economy. The engineer's log showed the following results:

Displacement, 27,400 tons; speed, 21.09 knots; fuel per day, all purposes, at 19,000 British thermal units, 168.8 tons; fuel per day, propulsion, 154 tons; shaft horsepower, 26,100; fuel per shaft horsepower, all purposes, .603 pounds; fuel per shaft horsepower, propulsion, .552 pounds; admiralty coefficient, 326; fuel coefficient, propulsion, at 19,000 British thermal units, 55,200; vacuum, 28.5 inches, 30 inches barometer; boiler efficiency, 88.3 per cent; fuel, 249 degrees Fahr.

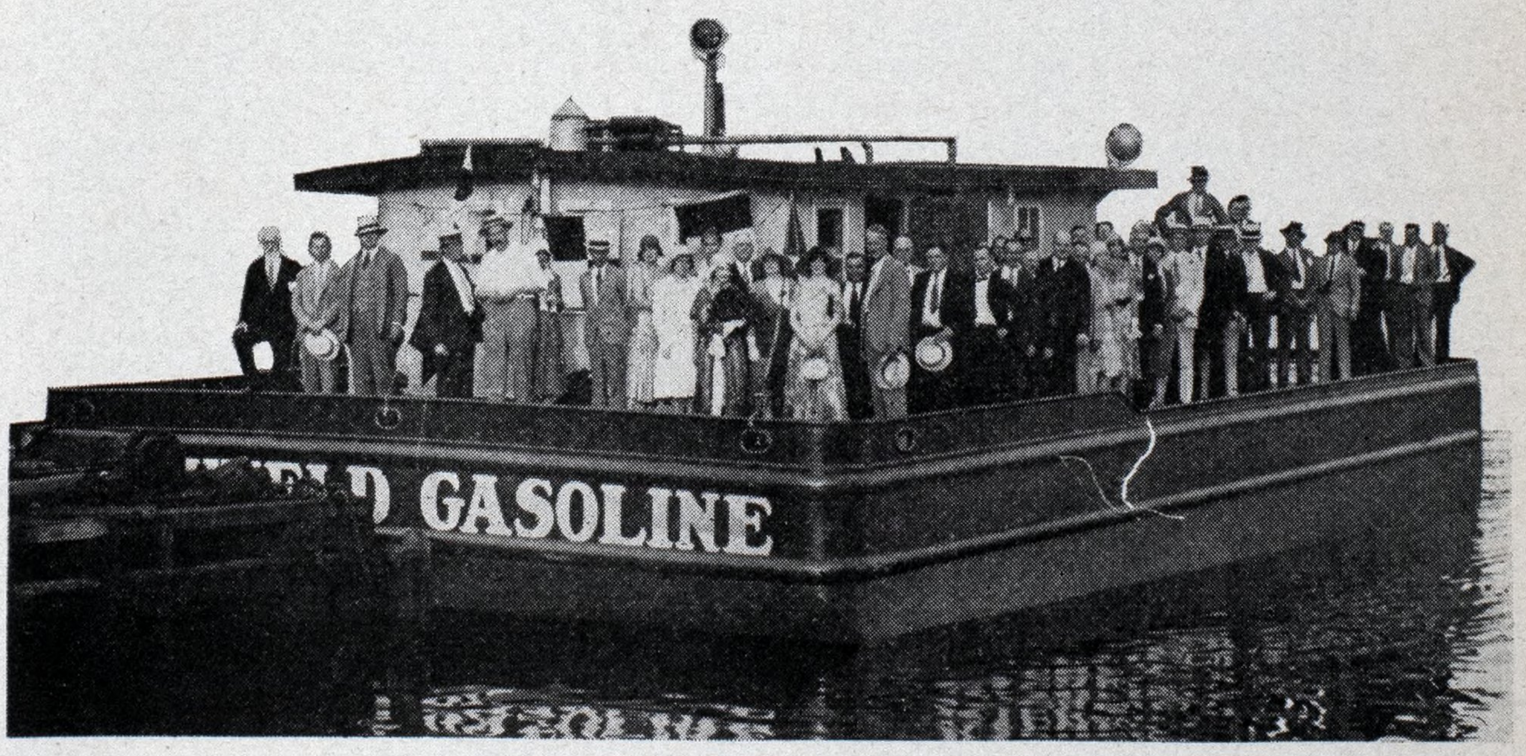
These figures represent an advance of about 12 per cent over the best results obtained by the Duchess class of vessels. Allowing for the fact that the engines were running somewhat below full power and that minor adjustments remain to be made, the result may be considered highly gratifying both to the owners and the builders, the Fairfield Shipbuilding, Engineering Co. Ltd., Glasgow.

Economy Type Ship Shows Good Results on Trials

Reports on the trials of the steamer ROBUR IV, the first of two vessels built by the A. B. Lindholmen-Motala, Gothenburg, for the Polskarob Polsko Skandynawskie Towarzystwo Transportowe, S. A., Gydnia, show that excellent results were obtained. Her contract speed was 10.25 knots, in ballast, but with 700 tons of water ballast on board she easily maintained an average speed of 10.67 knots, at which speed the coal consumption was measured. She is an improvement upon the 3,000-ton vessel standardized by the Lindholmen yard about ten years ago, which had a speed of 10.47 knots on trials with 540 tons of ballast, and a coal consumption of 15.9 tons against the ROBUR IV's 8.85 tons. The propelling machinery consists of a Lentz standard marine engine, all four cylinders being fitted with poppet valves. Steam is supplied by two Scotch boilers fitted with superheater, forced draught, and air and boiler-water preheaters. She has a Simplex balanced rudder.

Exportation of Dry Ice

Tampico has become the sole port in Mexico for the exportation of dry ice (solidified carbon dioxide) which is being made near the port by the Globe Petroleum Co. Gas for the product is obtained from wells in the state of Vera Cruz about 18 miles south of Tampico. With the dispatch of 40,000 pounds to New York on the Ward line freighter PANUCO, exportation has been started on a large scale. The freighters CAUTO and AGWISTAR are also being used in this service. Three freighters have been equipped with special compartments for the transportation of 200 tons each of the dry ice.



ALL-STEEL GASOLINE SERVICE BARGE APPEARS
Approximately 70 tons of shapes and plates were used in this barge, all welded, launched Aug. 5 at Elizabethport, N. J., for the Richfield Oil Corp., New York. It is reported to be the first vessel built especially for fueling power boats and seaplanes along the Atlantic coast, and is an experimental unit to determine an ultimate design for standard all-steel service stations, to operate under their own power. It was built by the Truss Weld Barge Co., Elizabeth, N. J., is 50 feet long, 30 feet wide, and 4-foot draft, containing three 10,000-gallon tanks, built integral with the hull

Personal Sketches of Marine Men

A. B. Sides, Formerly Vice President Eastern Steamship Lines Inc.

By A. H. Jansson

FOR twenty-five years he has had a varied line of experience in ship operation. He was appointed vice president nine years ago.

HIS decision to sever connections with steamship affairs to go into another business is regretted by associates and friends.

HE HAS a progressive attitude toward new developments which tend to replace antiquated methods. He is not ridden by tradition.

EXPERIENCED ship operating executives are not plentiful, in the United States at least, and it is with regret his associates and all those who know him find that A. B. Sides, vice president of the Eastern Steamship Lines, Inc., has resigned to enter other business. The regret is that a man of his long and varied training in successfully managing the operations of a large steamship company should be lost to an industry which particularly needs the direction of practical and able executives. All however, will wish him success and know that he can be counted upon to remain interested in the personnel and doings of the marine industry.

One of his outstanding characteristics is perhaps more needed among managers of steamships than any other, and that is an openness of mind to new developments. This is reflected in the operations of the Eastern Steamship lines by the manner with which modern equipment and methods have been applied to its cargo handling problems, not only at Boston and New York but also at all other ports at which the ships of the company touch. He was never satisfied to continue doing a thing in the same old way because of mistaken loyalty to tradition if a new way could be found with which there was a chance to increase efficiency and reduce cost. Anyone who has traveled on the steamers BOSTON and NEW YORK between these ports appreciates the management of the line. Cleanliness, good order, courtesy, comfort and excellent food well prepared, do not happen by accident and without effort on shipboard any more than they do ashore. One realizes at once on stepping aboard of the vessels of this line that the management is completely on the job.

A. B. Sides was born in Waldoboro, Me. in 1884. He did not wait to go through school before begining work; starting in with the Eastern Steamship Co. at Camden, Me. during the summers when he was still in high school. More than 25 years ago he was transferred to Boston as a clerk for the Boston Bangor line of the Eastern Steamship Co. The writer did not know him in those days but it is certain that he did his work efficiently as a clerk for it was not long before he was made agent of the line and then later general agent of lines east of Boston and finally in 1918 superintendent. He had a great teacher and example in Calvin Austin, one of the smartest steamship men in the country. During the war he joined the United States army and served overseas for a little over a year. After his discharge from the army he was appointed assistant to the president of the Eastern Steamship Lines, Inc. In 1921 he was elected vice president in charge of operations.

He has been a director of the Eastern Steamship Lines, Inc., the Boston and Yarmouth Steamship Co., Ltd., the Robert E. Lee Corp. and the Old Dominion Steamship Co. He is at present president of The Propeller club of the port of Boston, a director of the Boston Seamen's Friend Society, a member of the government board of the Maritime association of the Boston chamber of commerce, and also belongs to several clubs.

The Eastern Steamship Lines, Inc. is one of the largest of the coastwise companies and controls some 15 passenger and freight services along the American North Atlantic coast. The principal lines out of New York are to Boston, Portland, Me., and Richmond, Va. The lines out of Boston include one to St. Johns, N. B., one to Yarmouth, N. S. and one to Bar Harbor, Me.

Mr. Sides is leaving the Eastern Steamship Lines, Inc. to join Thompson's Spa, Inc. in an executive position. His new duties begin Sept. 1.

Build Lighthouse Steamer for New Zealand

ON Aug. 7 and 8 the twin screw lighthouse and general service steamer MATAI, built by R. & W. Hawthorn Leslie & Co. Ltd., for the government of New Zealand under the superintendence of E. H. Mitchell & Co., Newcastle on Tyne, ran a successful trial off the River Tyne. The vessel, which has an attractive appearance, is 228 feet overall with a beam of 35 feet. She is rigged as a two-masted fore and aft schooner with clipper stem and cruiser stern.

Although primarily intended for lighthouse service, she is also designed to serve as the official yacht for the governor general of New Zealand when required, and special accommodation is arranged on the bridge deck for this purpose. A large dining saloon extends the full breadth of the vessel on the upper deck. Accommodation is provided in the bridge tween deck for 24 lightkeepers.

The vessel has a complete electrical installation comprising two steam and one emergency generating sets. Refrigerated stores are installed on the lower deck abaft the machinery space and are fitted with CO_2 machinery.

The wireless installation comprises a 1½ kilowatt transmitter and emergency transmitter and two receivers. A direction finder and an echo sounding apparatus of the latest type are also fitted.

The vessel is specially arranged for dealing with buoys and is fitted with a special type of windlass for this purpose, while two derricks capable of lifting 6 tons and one of 15 tons are fitted at the foremast. (see page 19)

Life-saving appliances are of the most up-to-date description. A motor launch and surf boats are also provided on the boat deck.

The machinery consists of two sets of triple expansion engines of the direct-acting surface condensing type, having cylinders 12½ x 21, 35 inches working at 105 revolutions per minute. The air pumps, bilge and sanitary pumps are worked off the main engines, and the remainder of the auxiliaries including centrifugal circulating pump and Weir's feed pumps are of the independent type. Steam is supplied at a pressure of 180 pounds per square inch from two single ended cylindrical boilers which are fitted to burn either oil fuel or coal.

Barge Line Authorized Under Denison Act

The interstate commerce commission on July 24 authorized the operation of a fleet of barges on the Ohio and Mississippi rivers between Cincinnati and New Orleans and intermediate points by the Mississippi Valley Barge line, a $3,000,000 company. This is the first important privately owned barge line authorized under the provisions of the Denison act. The company proposes to establish through barge-rail and rail-barge-rail routes by way of Cincinnati between points in central territory, including Illinois and southeastern Wisconsin, and New Orleans and points in southern territory usually served by all-rail routes.

* * *

A number of vessels of the Commonwealth & Dominion line were recently equipped with Bauer-Wach system with highly satisfactory results. In addition to a saving in the cost of running, about 1,000 horsepower extra has been developed in each vessel, while the average speed has been increased by one knot. One of the vessels to undergo conversion is 16 years old.

What the British Are Doing in Shipbuilding

THE biggest shipbuilding order ever placed with a Teesside firm has been secured by the Furness Shipbuilding Co. of Haverton Hill. It is for two huge tanker whalers each weighing 21,500 tons to be fitted with quadruple twin screw machinery. They are to be built for Norwegian owners, but it is definitely stated that they will be of all-British steel. The company only recently launched a vessel of similar type and almost equal dimensions. This was the SIR JAMES CLARK ROSS, which has a length of 550 feet, depth of 480 feet and breadth of 74 feet. She has special equipment at the stern for hauling on board whole whales and with a complete factory on board the vessel is able to cut up the whales, boil the fats and remain at sea for weeks. There is also accommodation for a small airplane.

* * *

BRITISH shipyards are becoming very short of work. The tonnage launched last month was abnormally heavy, with the result that many berths are now vacant. The present British total of work on hand—1,392,063 tons—is 61,843 tons less than at the end of June, 1929. There are signs, however, that the outlook will be brighter later in the year, for it has been officially announced that the Cunard company is to build two new Atlantic liners. John Brown & Co. of Clydebank have been selected for one of these and it is hoped that a Tyneside firm will secure the contract for the other one. The government has agreed to undertake the insurance of both liners.

Another encouraging feature is that the railway companies are contemplating dock improvements in all parts of the country. The Southern railway has recently put into service new vessels representing a tonnage of nearly 9000. The London & North Eastern have introduced three new Clyde-built steamers for continental services totaling 12,600 tons, while the Great Western railway has put into service a steamer carrying 1000 passengers and weighing 2000 tons.

* * *

THE Scottish shipbuilding industry was comparatively busy in June, but in July many berths were vacant in the Clyde yards. Scottish shipbuilders launched a total tonnage of 34,598, and this added to the total for the first half makes 325,018 tons, as against 323,939 in the same seven months period of 1929.

* * *

PALMERS Shipbuilding Co. which recently did the unusual job of cutting out the midship section of the oil tanker CADILLAC and floating in a new section have received a contract from the Anglo-American Oil Co. for a similar piece of work on the sister ship SARANAC. The vessel will be cut into three, the middle section scrapped and a new section over 300 feet in length built in. This section which will contain about 4000 tons of British steel will be put in hand immediately and the SARANAC will not be docked until it is ready in January. The operation of fitting in the new section will take about seven weeks.

* * *

A NEW steamer, the DALHANNA recently launched by William Beardmore & Co. Ltd. is the third vessel to bear that name owned and managed by John M. Campbell & Sons of Glasgow. The first was a wooden sailing barque of 1600 tons built in 1880. It was registered at Glasgow and was the last deep sea wooden vessel to be registered at this port when her register was closed in 1903. The second to bear the name was a steamer of 7600 tons built on the Clyde in 1906 which vessel was lost during the war. The present steamer built to Lloyds 100 A. I. class is to carry 8800 tons deadweight on a draft of about 25 feet. The propelling machinery consists of a set of triple expansion engines operating in conjunction with an exhaust steam turbine on the Bauer-Wach system.

Reviews of Late Books

Manual of Naval Architecture, by George Charles Manning, M. S. cloth, 183 pages 5⅜ x 8½ inches; published by D. Van Nostrand Co. Inc., New York and supplied by MARINE REVIEW, Cleveland for $2.75 plus 15 cents postage, and in Europe by the Penton Publishing Co. Ltd., Caxton House London, for 12s 9d postage extra.

This book is prepared primarily for operating officers, students and all those who wish to become familiar with the subject of naval architecture without any extensive previous knowledge of it. It is written in a very clear and readable style and is illustrated by simple diagrams and interesting examples. This book is prepared for operating officers and on that account is different from most other works on the subject which have been prepared for those engaged in the design and construction of ships. The aim of the author has been to cover all the features of a hull. In the presentation of the subject matter, reference to difficult mathematics has been avoided as far as possible. Anyone with a knowledge of elementary algebra and trigonometry requisite for navigation should be able to follow through the very simple mathematical treatments presented in this book. The opening section of the book presents definitions of the various parts of the vessel. In other sections of the book the subjects of calculation of areas, etc., the problems of displacement, equilibrium, computation of metacentric radius, conditions and occurences affecting stability and others are covered. In addition there are practical examples which will help the student to a better understanding of this subject. This book should be of greatest value to everyone interested in ships.

1930 *Johnson's Steam Vessels and Motor Ships Manual*, cloth, 309 pages, 8½ x 4½ inches published by Eads Johnson, M. E. Inc. New York, and supplied by MARINE REVIEW, Cleveland for $1.00 plus fifteen cents postage and in Europe by the Penton Publishing Co. Ltd., Caxton House London, for 5s postage extra.

This book is a directory of all American-owned and self-propelled commercial vessels. There is an index in the front of the book giving alphabetically the name of the vessel with the name of the owning company. There is also an alphabetical list of owners, which gives the name of all vessels owned, the date and place they were built, the type and dimensions of hull, the gross and net tonnage, the type and horsepower of the engine, and the type and dimensions of the boiler. In the back of the book there are some interesting designs of typical vessels which should be found very useful by owners.

Motorship Manual, by A. B. Newell and J. Kuttner, fabrikoid, 288 pages 7 x 10 inches, published by National Trade Journals, Inc. New York City, and supplied by MARINE REVIEW Cleveland, for $5.00 plus 15 cents postage and in Europe by the Penton Publishing Co. Ltd., Caxton House, London, for 25s postage extra.

This book is an engine room guide, catalog, and register of American documented diesel vessels, and is a real textbook of operation. The numerous chapters on American diesel practice cover every phase of the subject in a way that every operator can understand. On this account it should prove of great assistance to those taking a test for an operator's license. Over 100 pages of this book have been devoted to a practical explanation of the technical fundamentals of diesel engine operation and construction. It is only within recent years that the technical essentials of the diesel engine have become sufficiently stabilized to permit collecting such data as are included in this manual. The various chapters include: Recent motor vessel construction, properties of the diesel engine; airless injection, cooling and maintenance of pistons, two cycle engine details, etc.

A special feature of the 1930 edition is the list of American documented diesel vessels. This list is broken down into groups such as tankers, cargo-and-passenger vessels, freighters, fishing vessels, tugs, ferry boats, yachts, etc. The name, gross tonnage, power, year built, and the name and address of the owner of each boat are given. Another interesting feature of the work is a section showing up-to-date illustrations and specifications of the leading marine diesel engines on the American market.

Weld Design and Production, by Robert E. Kinkead; cloth, 108 pages, 5¾ x 8½ inches; published by Ronald Press Co., New York, and supplied by MARINE REVIEW, Cleveland, for $4, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 20s, postage extra.

Lack of organized data on welding, though a great deal has been developed, led the author to undertake this work. It was his aim not only to collect these data but to corelate them and organize the fundamentals of welding. The book is designed primarily for engineers responsible for satisfactory and safe welds and executives responsible for cost elements of welding jobs.

Safety in welded structures, the all-important factor, is covered in discussion of welding procedure control. In this discussion the way is shown to eliminate probability of weld failures. Welds need no longer be uncertain and unsafe, the author claims, for the probability of failure can be brought to zero. In the many more possible applications of welding, not now used, the weld should be designed for the job and carried on with sufficient precision to assure uniform results.

A chapter is devoted to the reasons for welding, one to how welds are made and others to effects of physical conditions on weld behavior, actual welding conditions, welding procedure control machine welding and research and development. Numerous illustrations include charts, photomicrographs and diagrams. The text is fully indexed to facilitate reference.

Cost of Shipbuilding by M. Francis Carr, cloth 245 pages, 5½ x 7⅛ inches, published by Theo. Gaus' Sons, Inc., New York City and furnished by MARINE REVIEW, Cleveland, for $3, plus 15 cents for postage and in Europe by the Penton Publishing Co. Ltd., Caxton House, London.

In preparing the data for this volume, the author has attempted to provide a short method in calculating the cost of the many different types of merchant vessels, and to eliminate the practically obsolete system of figuring this class of work. While the book is concerned chiefly with merchant vessels, it is nevertheless true that a great deal of the subject matter will apply equally well to war vessels. To simplify the work of figuring the various parts of the vessel, sketches of the different members have been drawn, detailing many parts of the hull structure, locating the rivet holes in the plates and shapes, etc. A 12,000-ton deadweight capacity cargo vessel has been selected as an example, as vessels of this size and type will be mostly used as cargo carriers in future. To arrive at an approximate figure of the total cost of the vessel, the author has treated each plate, shape, etc., separately. According to the scheme, every piece of material that goes into the construction of the vessel has a fixed weight of material, the number and weight of rivets, the weight and cost of all machinery, etc., in fact, the cost and weight of all items that go into the complete ship are computed.

The approximate cost of passenger vessels, tug boats, river boats, barges, tanks, drydocks, etc., the repairing of damaged vessels, the cost of building a shipyard, and many other items relative to the cost of building ships will be found in the pages of this book.

Morro Castle in Service

(*Continued from Page* 28)

direct current, 230-volt motor driven exhaust fans, for ventilating the main propulsion motors.

The operating platform will be at the after end of the engine room with control station, telegraphs and speaking tubes, gages counters and clocks mounted on steel board in full view of the engineers on watch. No figures are given or predicted on the fuel consumption, but a tentative calculation places it, at sea at 20 knots, between 115 and 130 tons of fuel oil per 24 hours depending on how easily she makes her speed.

Main Boilers-Watertube Type

Six Babcock and Wilcox water tube boilers, are installed in two fire rooms. These are arranged in batteries of two boilers each; two batteries in the forward fire room and one battery in the after fire room. The fire rooms are separated by a watertight bulkhead, which extends to the shelter deck and is designed to accommodate the uptakes.

Boiler grates are set fore and aft and each boiler has been fitted with forced draft for oil burning. The boilers are connected to one smoke stack. There are two stacks, one of which is used for the boilers and one for ventilation purposes. The height of the smoke stacks at their fore and aft centers is about 113 feet 6 inches above the base line of the vessel and they are 9 feet 6 inches wide by 15 feet 3 inches fore and aft for inside stack and 12 feet 9 inches by 19 feet 6 inches for outside stack.

Working pressure of the boilers is 300 pounds per square inch and each boiler is fitted with superheaters of the interdeck type with a total superheating surface of about 3450 square feet. Superheat at superheater is 200 degrees Fahr. The total water heating surface of the boilers is about 43,000 square feet with tubes of 2 inches and 4 inches. Total grate surface of main boilers about 736 square feet with 7-foot grate bars.

Method of Operating the Ship

The main turbine generators supply high voltage, alternating, three phase current to the control apparatus, which by means of the high voltage contacts groups will close the electric circuits to the main propulsion motors directly connected to the propeller shafts. The machinery is arranged so that normally one main turbine generator will furnish power for driving the port propulsion motors and the second turbine generator will furnish power for driving the starboard propulsion motor. Provision however has been made, so that either main turbine generator can drive both port and starboard motor at approximately 100 revolutions per minute of the propellers. Variation in propeller revolutions in either direction is obtained by varying the turbine speed and is always under the direct control of the operator at the control station.

The propellers are reversed by changing the relationship of two of the three phases leading to the motors, and is quickly accomplished by switches which are operated by levers located at the control station. The turbine generators will always run in the control direction, and with both in operation the speed of either propeller may be varied or reversed irrespective of the other. When one turbine generator is being used for driving both propelling motors, both motors must always be operated at the same speed, except that one motor may be stopped with respect to the other, and, furthermore, one motor can be reversed with respect to the other, but when so reversed both motors will still operate at the same revolutions per minute.

There are two main surface condensers, one for starboard main turbine and one for the port main turbine, each condenser containing about 9000 square feet of cooling surface. They are fitted with ¾ inch outside diameter No. 17 Birmingham wire gage thick tubes. There is one auxiliary condenser containing about 2600 square feet of cooling surface.

Pulverized Coal Installed In Several Freighters

The number of installations of the Todd system of pulverized coal burning is constantly increasing. There are now in service two test plants on shore. One is located at Birkenhead, England; the other at the Teboe yacht basin, Brooklyn, N. Y.

This system of pulverized coal burning has also been installed in the shipping board freighter WEST ALSEK; in the seagoing tug PACIFIC MONARCH and in the freighter BERWINDVALE, owned by the Berwind White Coal Co. and operated by the Staples Coal Co. in the coastwise coal trade between Boston and Norfolk.

The British ship INCHMOORE of the Furness, Withy line has also been recently fitted to burn pulverized coal. When this is written the INCHMOOR was on her way to the United States via Bermuda.

Pulverized coal burning installations of this type are also now being made in FRANK C. BALL, self-unloading sand sucker under conversion at the Lorain, O. yard of the American Ship Building Co. for the Construction Materials Corp., Chicago; in the shipping board freighter LORAIN at the Todd Dry Dock Engineering & Repair Corp. yard Brooklyn, N. Y.; and in the S. S. BREMERTON being converted to a bulk self-unloader at the yard of the Jahncke Dry Dock Co., New Orleans.

Excalibur Launching, Aug. 5

(*Continued from Page* 31)

rine steam engineering. Steam at 350 pounds pressure and 200 degrees superheat will be supplied by four Babcock & Wilcox oil fired watertube boilers with a total heating surface of 16,000 square feet.

Navigating instruments of modern design will be installed, including a Sperry gyro compass and gyro pilot. There will be a radio direction finder and a high powered wireless set with capacity for maintaining continuous communication with shore during the voyage from New York to Gibraltar. Lifesaving equipment, lifeboats and davits, of the latest type will be fitted to meet the requirements of the international safety convention. Fire protection will be provided by a CO_2 system and all passenger quarters will be served by an automatic fire alarm system.

Liner Beats Own Record

When the Grace line turbo-electric flagship SANTA CLARA arrived in New York on Aug. 21 from Cristobal, C. Z., she established a new record for the run, having made the voyage in four days and eight hours, clipping three hours and 16 minutes from her own record made on her maiden voyage in April. The liner maintained a speed of 20 knots during most of the trip and at one time attained a speed of 23 knots, thus exceeding her best trial run speed in Delaware bay.

* * *

Announcement of the reorganization of six executive departments of the Charles Cory & Son Corp. New York, for 90 years manufacturers of marine equipment, and recently merged as another unit of the Bendix Aviation Corp., was made recently by A. P. Homer, vice-president.

New Whaling Company

Arrangements have been made for the formation of a whaling company under the name of the American Whaling Co., Ltd., the capital consisting of 47,000 shares of no par value. The new company will take over the floating oil refinery FRANGO, 9020 tons, for $400,000 payable as to $160,000 in cash and the balance by 24,000 shares in the American company. The present owners of the vessel, will thus hold a controlling interest in the company. By this arrangement the whale-oil can be imported into America customs-free. Two American banks, which will be interested in the company, have undertaken to provide the necessary operating expenses.

The Cunard liner MAURETANIA on each of her last 18 eastbound Atlantic voyages has averaged more than 25 knots, thus adding another record to her list.

Ship Repair Yard Facilities

(*Continued from Page* 44)

dling voyage repairs at South Peter's street and one at Algiers where a complete ship repair yard has been established with a floating dock of 6000 tons lifting capacity. Adequate berthing facilities are available at this plant as well as complete shop equipment for any type of repair work.

The most important ship repair plant in the Pacific northwest is the Todd yard at Harbor Island, Seattle. Three floating docks with lifting capacities up to 12,000 tons have been provided at this point and with every type of equipment available.

All of the Todd plants are on deep water, directly accessible from sea ship channels. Control of all plants centers in the office of the president at 25 Broadway, New York. With its seven yards and twenty-six dry docks with capacities ranging from 500 tons to 35,000 tons, the Todd Shipyards Corp. can handle more than 180,000 tons of shipping daily.

Busch-Sulzer Bros. Diesel Engine Co., St. Louis, states that while the United States has no diesel-engined passenger liners, Great Britain has 32 of 479,460 tons, Holland 11 of 155,010 tons, Germany 10 of 128,-260 tons, Japan 10 of 127,860 tons, France 8 of 108,140 tons and Italy 6 of 117,370 tons.

Diesel Ships Increase

The list of motorships equipped with diesel engines of the Burmeister & Wayne type as of July 1, 1930, totaled 571 of 2,140,462 indicated horsepower, 4,259,757 deadweight tons, 3,172,541 gross tons and 6,-452,662 tons displacement. On July 1 there were 138 motorships under construction or on order equipped with these engines with an indicated horsepower of 646,642, deadweight tonnage of 1,231,005, gross tonnage of 926,040 and displacement of 1,-813,830 tons. In addition 92,173 indicated horsepower of marine engines for submarines, auxiliary purposes, etc., are under construction or on order.

New Texas Waterway

A straight channel is to be cut from the Gulf of Mexico to Brownsville, Tex. where the Rio Grande was formerly used. This channel is to be 17 miles long, 25 feet deep. The Rio Grande takes 100 miles to go between the same points, due to its meanderings.

Congress in the recent rivers and harbors bill appropriated $2,158,000 for the port of Brownsville, to which has been added $4,000,000 locally. The surveys are being made now, and the actual construction work will be started within a short time. The government also has appropriated $150,000 annually for maintenance of this port in proper condition to accommodate ocean shipping safely and efficiently.

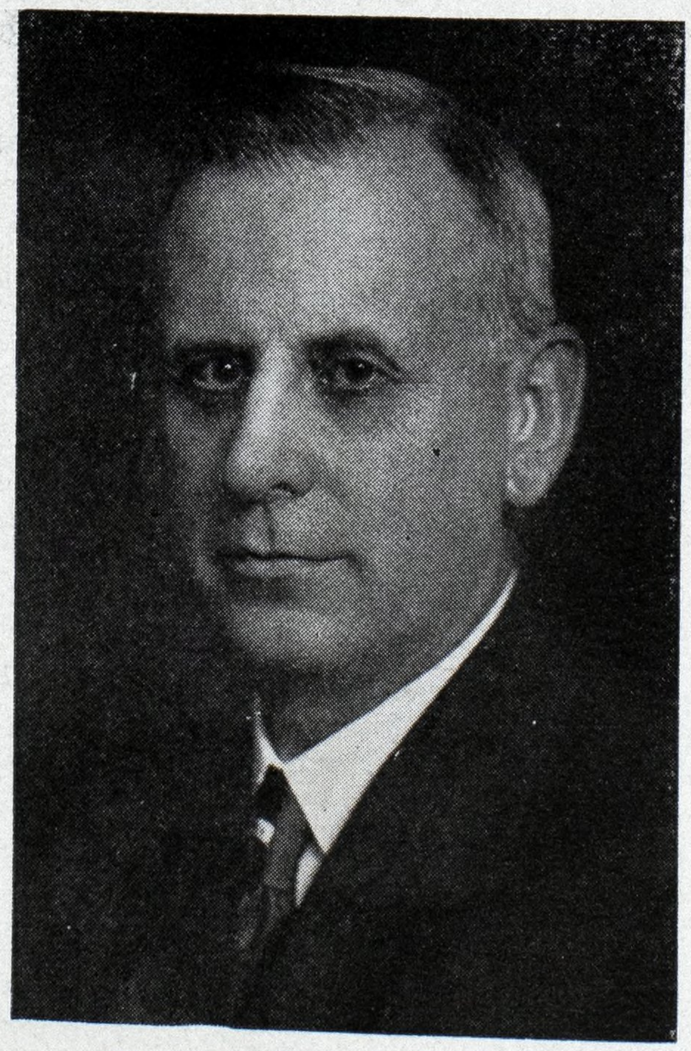
The port will be used mainly for outgoing commerce. From northern Mexico will come ores and other raw materials, which will be shipped across the Rio Grande in the raw state to avoid duties on finished products, oil from the West, citrus fruit from the Rio Grande district.

Successful outcome of the city's twenty-year efforts for deep water is attributed largely to the untiring work of Congressman John N. Garner from this district, who has made it his "pet" local project during his years in Congress.

The twenty-third annual convention of the Atlantic Deeper Waterways association will be held at Wilmington, N. C. Oct. 7 to 10. The passage by congress of the largest rivers and harbors bill in history, including work on various segments of the Atlantic intracoastal waterway, the Mississippi valley, the Great Lakes and the gulf, will be discussed.

Chief Engineer of American Bridge Company Dies

James Harvey Edwards, 66, chief engineer of American Bridge Co., subsidiary of United States Steel Corp., died Aug. 14. Mr. Edwards was born in Oxford, N. Y., was a graduate of Oxford academy, Cornell university, and prior to the beginning of his affiliation with American Bridge Co. in 1900, was assistant chief engineer of Berlin Iron Bridge Co., East Berlin, Conn.



James Harvey Edwards

National Safety Council to Meet at Pittsburgh

The national safety council will hold its nineteenth annual safety congress and exposition in Pittsburgh, Sept. 29 to Oct. 3. Rear Admiral Richard E. Byrd is to give the keynote safety message and he will be the only speaker at the banquet session of the largest world gathering of the year exclusively in the interest of accident prevention.

During the five days of the congress there will be 150 different safety sessions, including those dealing with marine affairs.

The sessions of the marine section will be held on Sept. 30, Oct. 1 and 2 and the program offers a varied and instructive group of papers dealing with all phases of accident prevention work. A list of speakers and their subjects follows:

"Proper Inspection and Selection of Materials Prime Factors in Safety" by Capt. John Woolverton; "Safe Operation of Tugs" by Robert Scott; "Safe Handling of Cargo Through Side Ports" by W. L. Bull; "Operating Tugs, Lighters, Barges and Car Floats Safely," by F. H. Cogan; "Prevention of Accidents and Explosions on Tank Steamers" by G. Guy Via; "Posters Sell Safety" by Robert F. Hand; "How and Why Marine Accidents Happen" by F. C. Gregory; "Economic Wastage Caused by Personal Injuries" by E. H. Jewett; "Hazards Incident to Operation of Pleasure Craft" by A. J. Smith "Safe Operation of High Pressure Water Boilers at Sea" by R. E. Hall; "Accident Prevention in Operation of Ferry Boats" by William S. Wollner; "Safety in Salvage Operations" by Capt. N. W. Davis.

Canal Barge Merger Plans

The Hedger Transportation Co., which recently took over 15 canal boat companies operating on the state barge canal, plans to continue its activities in this direction until every line operating on the canal and adjacent waterways has been absorbed. The affiliation is headed by William E. Hedger of New York and the consolidation of barge service is expected to result in greater efficiency with improved schedules and regular movements of vessels. The merger involves approximately $2,000,000.

The proposed operation of the state barge canal by the federal government with its promise of increased business on the canal and adjacent waters, is thought to have prompted the merger. The lines involved are: Hedger Transportation Co., W. E. Hedger, Inc., Ballenas Co., Baryton Co., Dixie Co., Holbrook Co., Nat Sutton Co., Pearl Harbor Co., Winthrop Co., Harbor Towing Co., Whitehall Co., Willet Co., Oneida Transportation Co., Quantico Co., Frederic, Lennig Co., and Hedger Barge Co., Inc.

Up and Down the Great Lakes

Increase Lake Diversion—July Lake Levels—Big Drop in Ore Shipments—Illinois Waterway to Be Pushed—Fire Damages One of the Oldest Granaries on the Great Lakes

EFFORTS are being made by the Chicago association of commerce to preserve for Chicago shippers, both rail and water, the benefits to arise from an all-water route from Lake Michigan to the Gulf. The association has filed a brief with the interstate commerce commission at Washington with that idea in view, in which protest is made against the recommendation of the commission's examiners to increase the rate of rail-carriers operating in the Chicago switching district on freight that comes to them by water.

Recommendation for increased rate was made recently by the commission's examiners in a report on freight charges in the Chicago switching district, but the commission has not yet acted upon these findings. Alleged rate discriminations affect only the Chicago switching area. There now exists a special freight rate of from $15 to $18 a ton in the district, but no freight coming into or leaving Chicago by water qualifies for this special switching rate. In its brief, the association of commerce points out that it now costs from $9 to $18 a car more to transport freight that moves by water, in comparison with the corresponding movement of any other freight entering or leaving the switching district by rail. The brief points out that if the examiners' proposed increase in switching rate goes into effect there will be from 43 to 100 per cent discount against freight moved to or from dock terminals by the railroads.

Increase Diversion

A temporary increase in the diversion of water from Lake Michigan, sufficient to bring the flow up to 12,000 cubic feet a second, has been authorized in the drainage canal at Lockport, Ill. This action was taken as a result of the emergency late last month caused by the drought. It was stated that the order was issued in accordance with the existing permit from the war department which authorized an annual average flow.

The 12,000 cubic feet now ordered is in excess of the authorized average and therefore will have to be compensated later by a corresponding reduction.

Authorization already has been sought by Gov. L. L. Emmerson, of Illinois. Engineers and legal advisors of the war department have acted favorably upon the request. The existing permit calls for an average of only 6500 cubic feet per second. The low level in the Illinois river has brought about conditions which made increased diverison imperative, particularly until more rainfall results. Conditions caused by low water levels at Chillicothe, Ill., were described as the worst in ten years. Complaint also resulted from conditions at Joliet, Ill.

July Lake Levels

The United States Lake survey reports the monthly mean stages of the Great Lakes for the month of July as follows:

Lakes	Feet above mean sea level
Superior	602.98
Michigan-Huron	581.28
St. Clair	576.26
Erie	573.48
Ontario	248.09

Lake Superior was 0.38 foot higher than in June and it was 0.11 foot higher than the July stage of a year ago. Lakes Michigan-Huron were 0.22 foot higher than in June and they were 1.08 feet lower than the July stage of a year ago. Lake Erie was 0.25 foot lower than in June and it was 0.65 foot lower than the July stage of a year ago, 1.08 feet above the average stage of July of the last ten years. Lake Ontario was 0.02 foot lower than in June and it was 0.27 foot lower than the July stage of a year ago, 1.84 feet above the average stage of July of the last ten years.

Big Drop in Ore Shipments

According to a report issued Aug. 1 by the Lake Superior Iron Ore association, there was a decrease in ore shipments from Lake Superior for the month of July of 2,084,233 tons or 19.53 per cent over the same month of last year. Total tonnage moved this July was 8,586,649 tons compared with 10,670,882 tons for July of last year. To Aug. 1 there was a seasonal loss of 8,585,598 tons over last year. In 1929 to Aug. 1 the total shipments were 32,910,820 tons as against 24,324,222 tons this year. At the beginning of navigation it was estimated that 58,000,000 tons of ore would be moved on the Lakes this season. To the present time there has been less than half of the amount shipped. As would be expected there has been a marked decrease in ore movement from Lake Erie docks to interior furnaces, there having been 16,000 less cars shipped during July than for the same month last year.

The movement of coal has been going ahead rapidly and during July 99,887 cars were dumped as compared to 99.905 for July last year.

Fire Damages Elevator

One of the oldest granaries on the Great Lakes was almost destroyed when the Globe elevator at Buffalo caught fire July 21 and became one of the fiercest fires ever experienced along the Buffalo waterfront. Approximately $200,000 damage was done to the building and machinery and this would have been much greater were it not for the fact that very little stock was in the elevator at the time. The building was fully covered by insurance.

So great was the fire that the warehouse district of Buffalo's waterfront was believed endangered. After several hours however, the flames were brought under control. The main section of the building is seven stories high and comprises three stories of brick and a three-story addition of sheet iron and wood.

To Push Waterway

Belief is expressed that the Illinois waterway will be pushed to completion by April 1, 1933. This is a link in the Lakes-to-Gulf water route. The federal government is to carry forward the remainder of the project. Congress appropriated $7,500,000 to finish the Illinois waterway between Lockport and Utica, Ill.

Work by the state has been closed down, except for some dredging. The $20,000,000 which Illinois is spending of its own funds has been insufficient to complete the project. A number of bridges also will be built by the state.

Lake Captain Dies

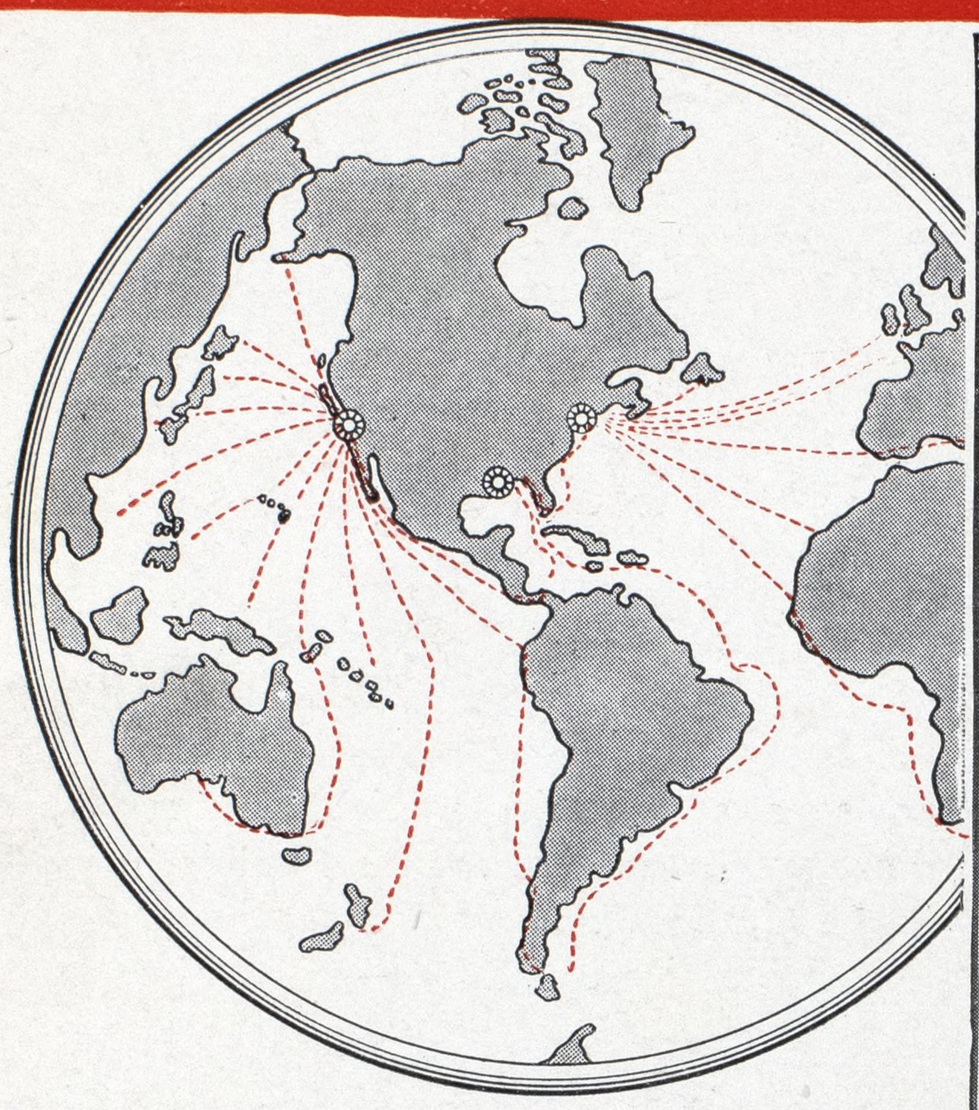
Capt. Walter P. Rouvel of Marine City, Mich., one of the best known shipmasters on the Great Lakes died suddenly Aug. 7. at General hospital in Buffalo. Capt Rouvel was master of the steamer D. O. MILLS of the Interlake Steamship Co. He began his career on the Lakes with the Mitchell line boats.

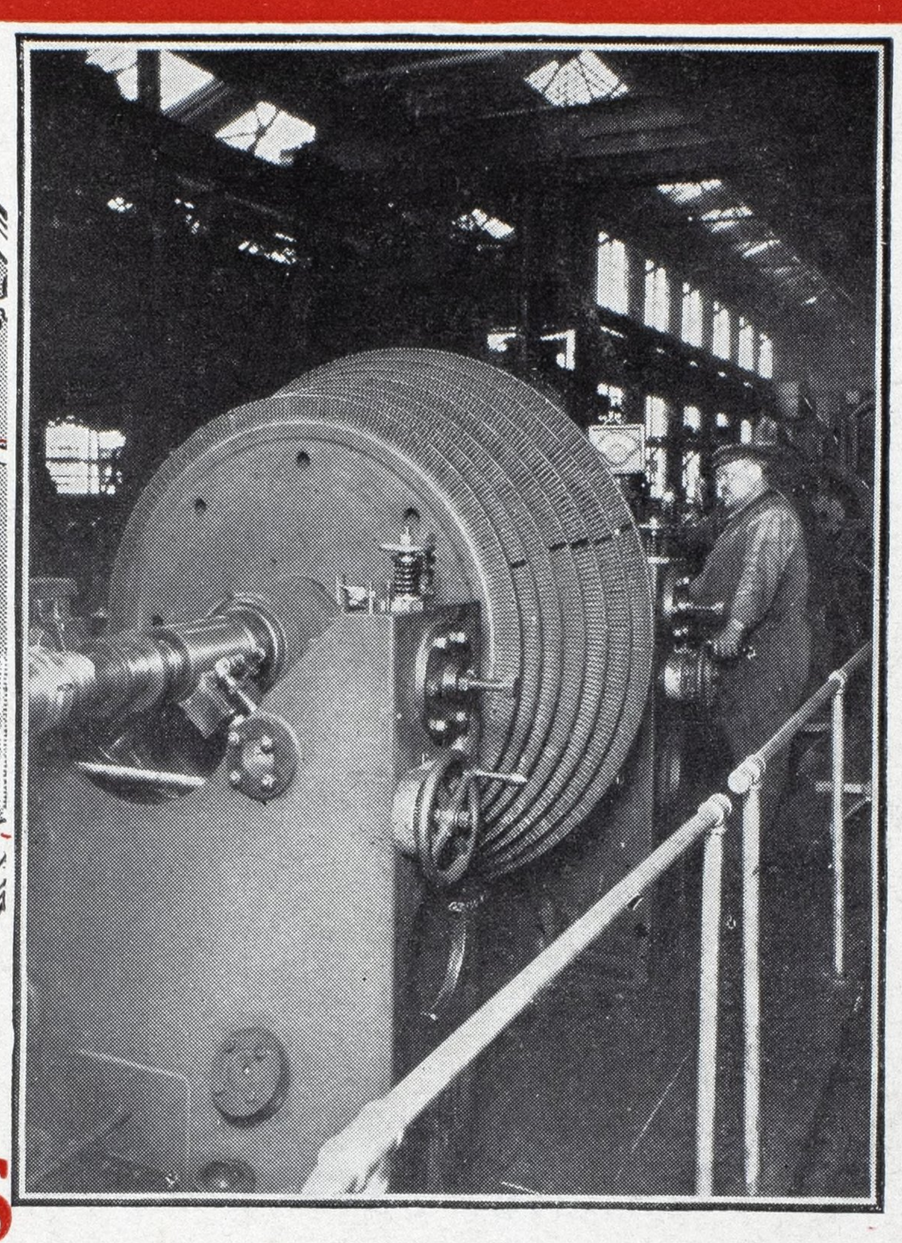
Marine Review

Reg U.S. Pat. Off.

The National Publication Covering the Business of Transportation by Water

September, 1930





Rotor from the S. S. "President Roosevelt", United States Lines, on the 20-ton dynamic balancing machine at the Robins Plant.

TODD FACILITIES
For Turbine Equipment and Repair

No shipyard offers more modern facilities for the balancing or reblading of turbine rotors than the Robins Plant of the Todd Shipyards Corporation at Erie Basin, New York.

The new 20-ton capacity dynamic balancing machine and equipment for the manufacture of blading, together with a complete stock of parts and materials plus a staff of Todd trained mechanics, offers unexcelled service for all turbine driven vessels of whatever size or type.

Todd Engineers are available at all times for consultation.

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24 Floating Dry Docks
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LARGEST DRY DOCK in NEW YORK HARBOR

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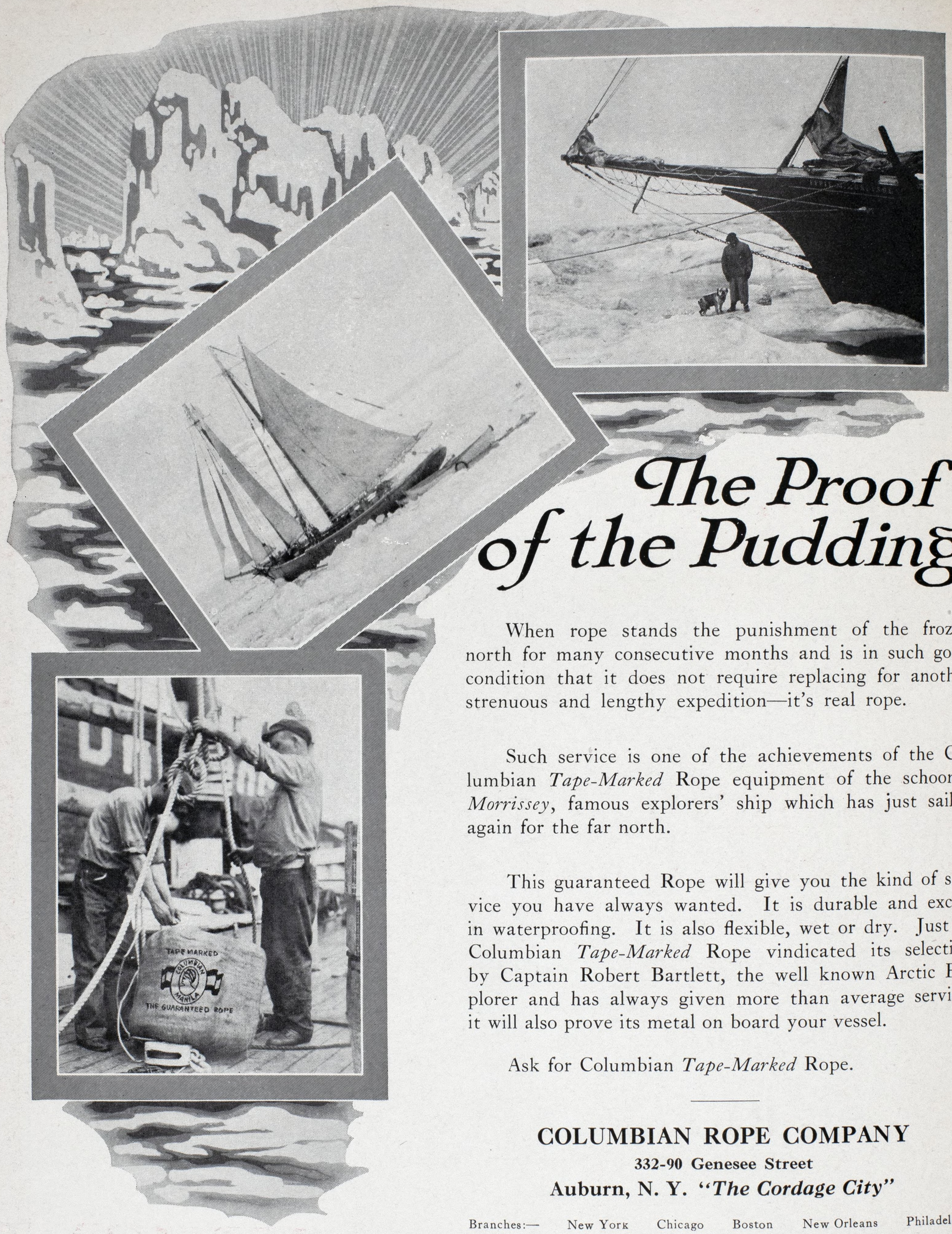

The Proof of the Pudding

When rope stands the punishment of the frozen north for many consecutive months and is in such good condition that it does not require replacing for another strenuous and lengthy expedition—it's real rope.

Such service is one of the achievements of the Columbian *Tape-Marked* Rope equipment of the schooner *Morrissey*, famous explorers' ship which has just sailed again for the far north.

This guaranteed Rope will give you the kind of service you have always wanted. It is durable and excels in waterproofing. It is also flexible, wet or dry. Just as Columbian *Tape-Marked* Rope vindicated its selection by Captain Robert Bartlett, the well known Arctic Explorer and has always given more than average service, it will also prove its metal on board your vessel.

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Vol. 60, No. 9, Sept., 1930, issue of MARINE REVIEW, published monthly at Cleveland, Ohio. Entered as second class matter at the post office, Cleveland, Ohio, under the act of March 3, 1879. Subscription price $3.00 a year in U. S.; Canada, $4.00; Great Britain, £1; single copies, 35c.

80%

of 6,000 to 15,000 TON SHIPS Under Construction June 30, 1930 Are . . .

MOTORSHIPS

	Steamers	*Motorships*
Great Britain	20	85
Germany	5	17
Holland	None	14
United States	8	3
Sweden	None	11
Japan	None	11
France	5	2
Denmark	None	5
Spain	None	4
Italy	1	3
Russia	None	4
Norway	None	1
Total	39	160

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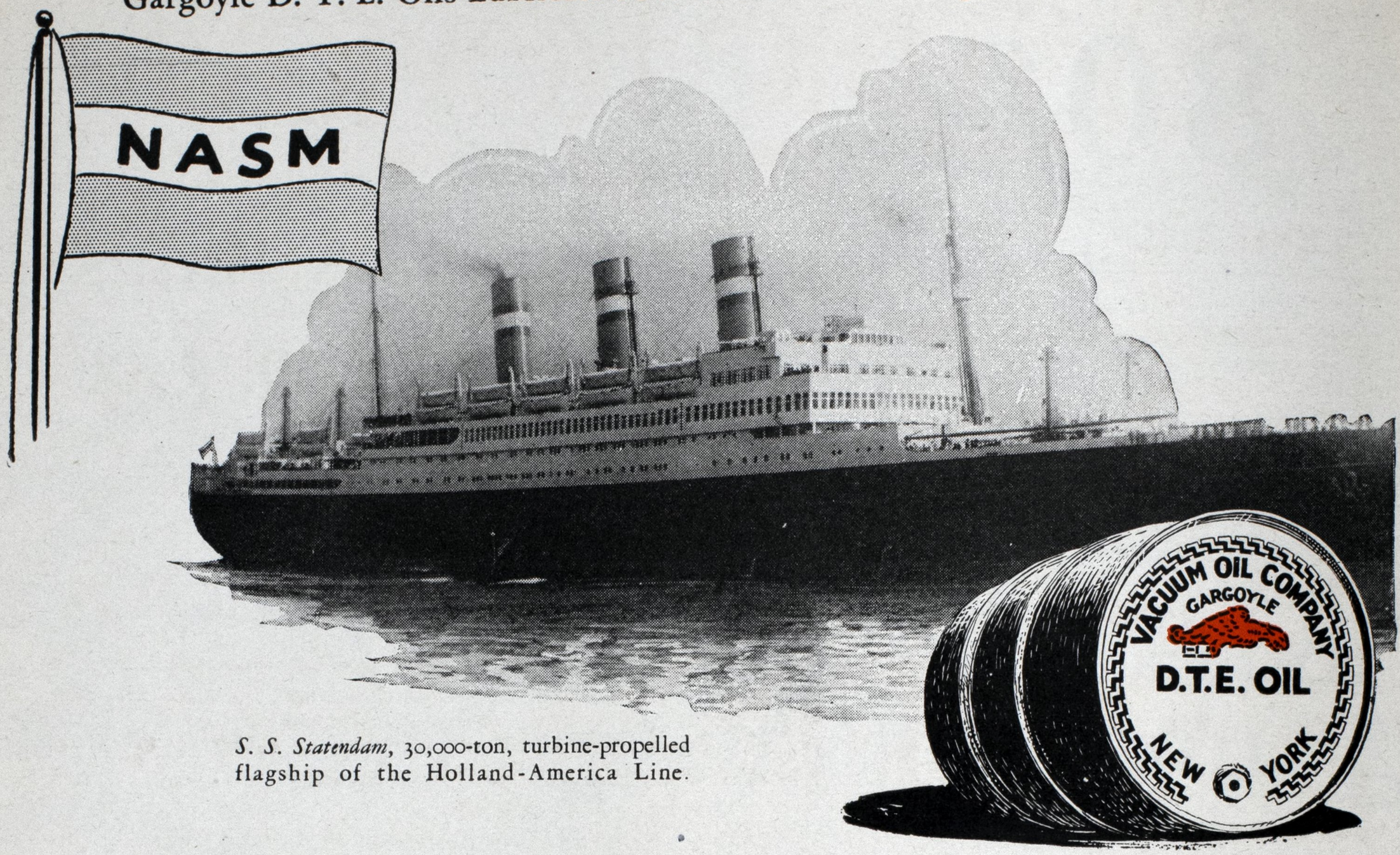
Gargoyle D. T. E. Oils Lubricate 53% of the world's ships of over 20,000 tons



S. S. Statendam, 30,000-ton, turbine-propelled flagship of the Holland-America Line.

Correctly lubricated flagship of a great fleet

When the *S. S. Statendam*, new flagship of the Holland-America Line, was placed in regular service between Rotterdam and New York last year the reliable operation of her great steam turbines was safeguarded by the use of Gargoyle Marine Oils.

The *Statendam's* first-year performance has been eminently satisfactory—again proving the sound economy of scientifically correct lubrication.

Other Holland-America Line ships, too—such as the *Rotterdam* and the *Nieuw Amsterdam*—rely on these high-grade lubricants to keep their power plants operating at top-notch efficiency.

Holland-America Line engineers join the hundreds of marine engine experts throughout the world, whose experience has shown that Gargoyle Marine Oils —

furnish the best insurance against untimely breakdowns and costly repairs;

conserve power by reducing friction to a minimum;

reduce fuel and oil consumption;

prolong the life of propelling machinery.

You will find a ready supply of Gargoyle Marine Oils on sale in more than 300 of the world's leading ports. The Vacuum Oil Company representatives in all these ports are thoroughly familiar with every type of marine engine. They can help you solve your particular lubrication problems.

NOTE: We will be glad to send you, without obligation, either of our authoritative treatises on Marine Lubrication: "Steamships with Reciprocating Engines"—"Marine Lubrication—Motorships." Address your request to: Vacuum Oil Company, Marine Sales Dept. D-9, 61 Broadway, New York City.

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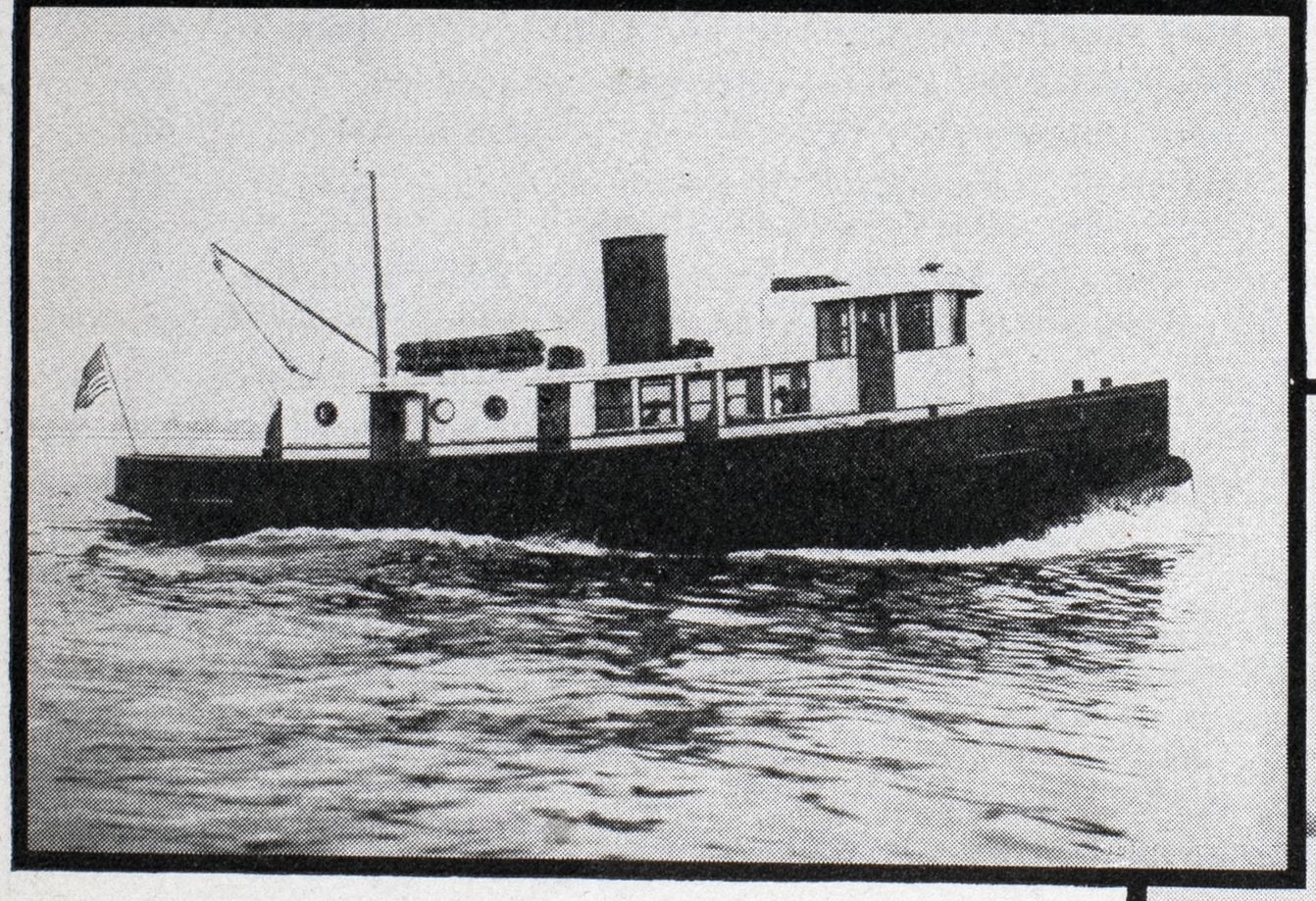
Vacuum Oil Company *Specialists in the manufacture of high-grade lubricants for every class of machinery Obtainable everywhere in the world* ***New York, U. S. A.***

Problem of operating solved

The Tug MADISON *has not worn out its Goodrich Bearing yet. Read its remarkable performance record on the opposite page.*



F. W. MEADE (*above*), *built by the Wheeler Shipyard, is a U. S. Health Service harbor boat, heavily built for the rigorous work of intercepting incoming ships. Equipped with Goodrich Bearings.*

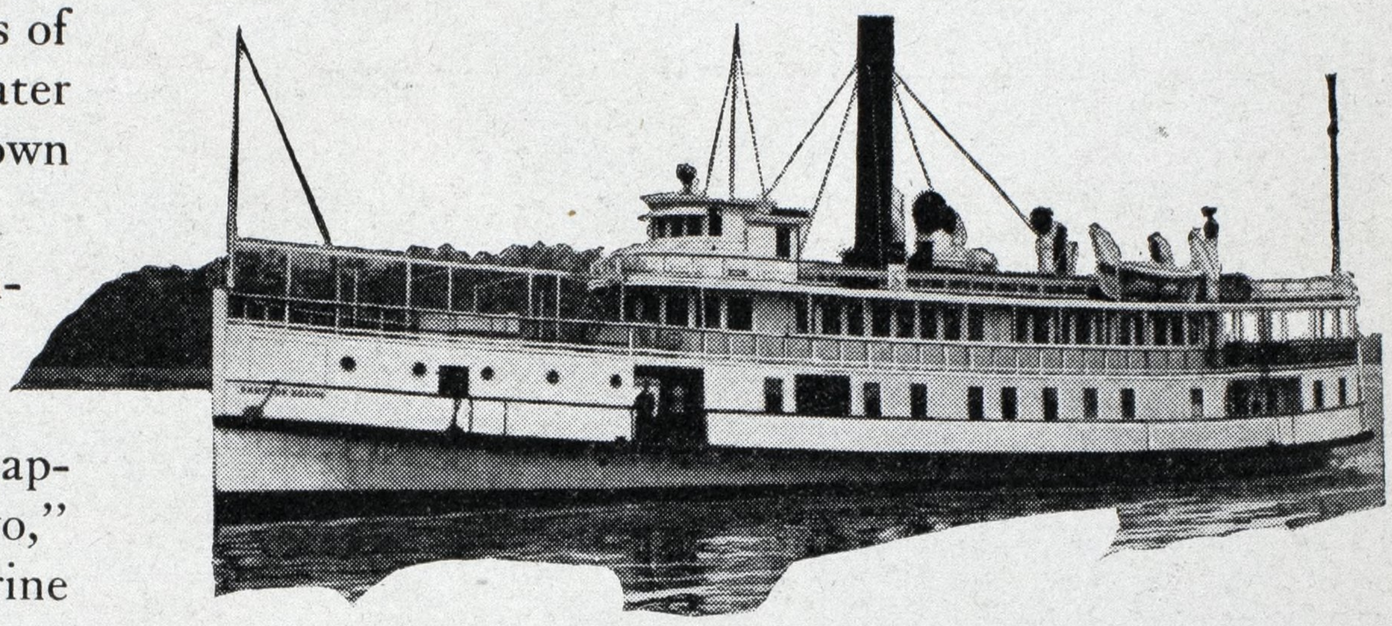
The 100-foot JOHN J. GALLAGHER, *largest Diesel tug in New York harbor, built by the Port Washington Shipyard and Motor Corporation, powered with Fairbanks-Morse engine and equipped with Goodrich Bearings for service in muddy harbor waters.*

in muddy water by this bearing . . .

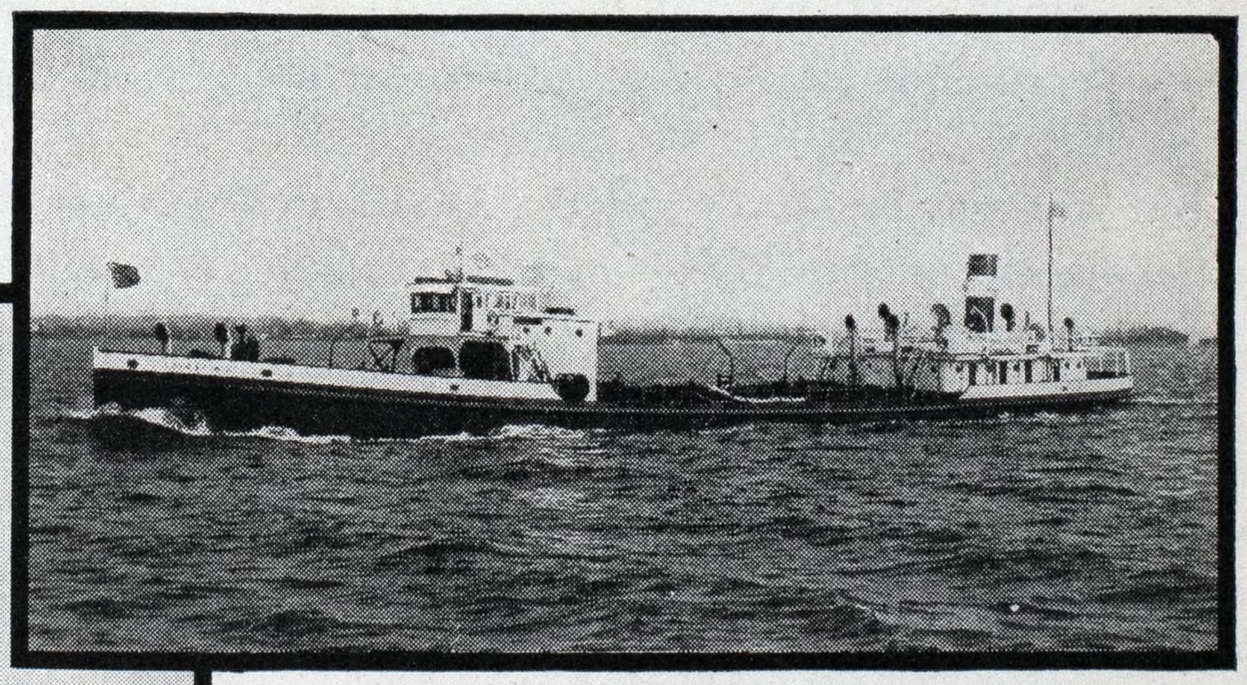
"Great saving to ship owners and operators," *writes manager of* D. L. & W. *Marine Department*

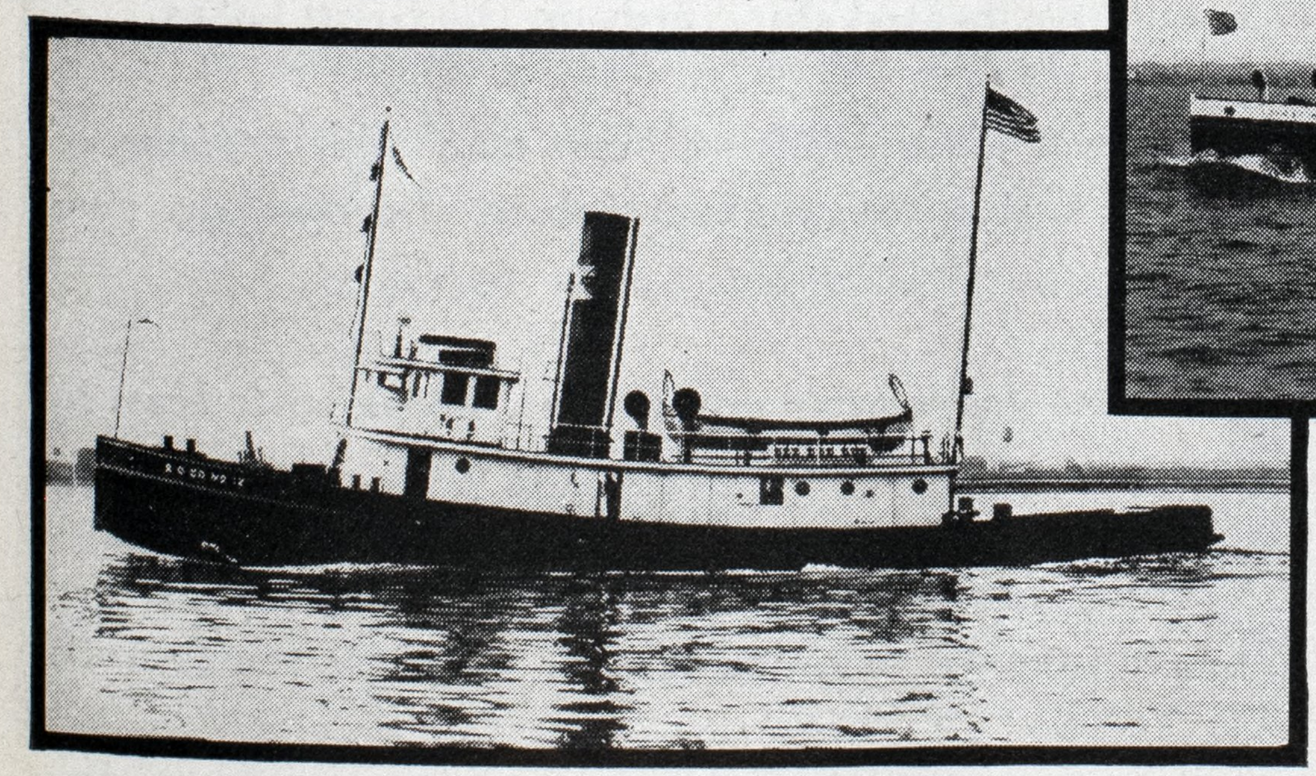
THE unusual savings which Goodrich Bearings make possible to operators of vessels navigating in muddy and sandy water are well illustrated by records of boats shown on these pages.

"The Goodrich Rubber Bearing installed on our Tug MADISON, May 11th, 1924, is about to complete its sixth year of service and from the last inspection apparently is good for another year or two," writes John M. Emery, Manager of the Marine Department of the Delaware, Lackawanna and Western Railroad Company. "During the past six years," he continues, "the MADISON has averaged over three hundred working days per year and with two crews operates sixteen to eighteen hours daily. Your Company is to be congratulated upon this splendid achievement which apparently will mean a great saving to ship owners and operators."



Steamer HAMPTON ROADS, *operating in the sandy Rappahannock, carrying Goodrich Bearing for 8⅝" shaft installed last August. "Your Cutless Rubber Bearing has solved a problem that we were constantly confronted with," writes owner. "I would not hesitate to recommend Goodrich Cutless Rubber Bearings to anyone operating in shallow water."*





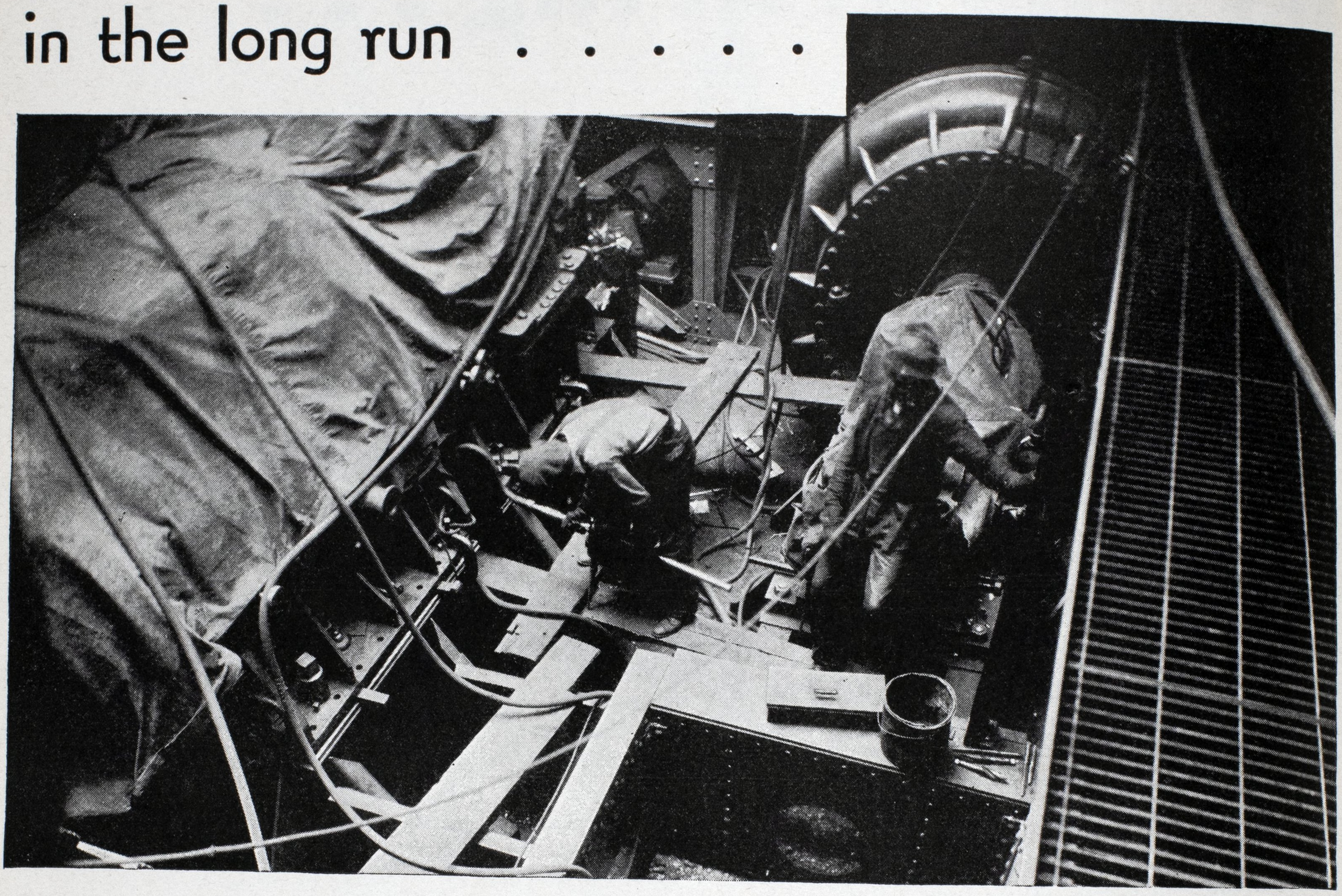
(Above) *The* J. H. SENIOR,* *Diesel-Electric Oil barge owned by the Standard Oil Company of New Jersey. A Goodrich Bearing served this boat for 265,000 miles in the shallow waters of Chesapeake Bay.*

(Left) *In the* STANDARD OIL COMPANY NO. 12, *a bearing installed in April of this year replaced another Goodrich Bearing installed in August, 1924. Prior to this, other bearings had been replaced every six or eight months.*

Goodrich *Cutless* Bearings

Another B. F. Goodrich Product

AMERICAN SHIP always tries to do ship repair work the way it costs customers least in the long run . . . . .



No matter how big the job is—or how small—when you send a ship to us for repairs, you always get a *good,* dependable job. And as everyone knows, a good, dependable job is the only job that is really cheap.

That you may be served swiftly, American Ship has concentrated complete modern equipment and extensive stores of materials at each of its five conveniently located ship yards on the Great Lakes.

That you may be served reliably, American has gathered a force of workers who feel a sense of personal responsibility for every job they do. The result is that they do each job in the best way possible—and they do it speedily.

American Ship's old customers are firmly convinced that *dependable* repair work keeps costs least in the long run. So they entrust their small ship repair jobs to us, as well as the big ones.

Each year, other ship operators and owners are deciding that good repair work is the most satisfactory method of keeping repair costs low. And they, too, are turning to American for *all* their repair work —big jobs and little.

The AMERICAN SHIP BUILDING CO.

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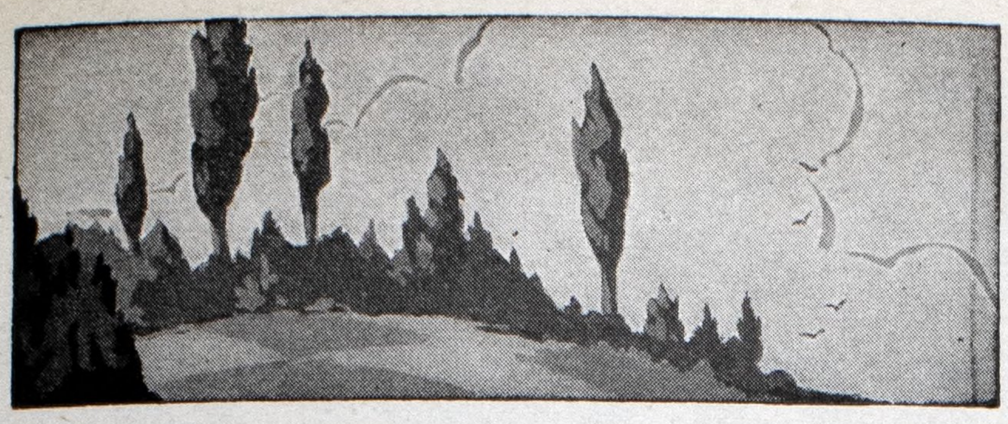
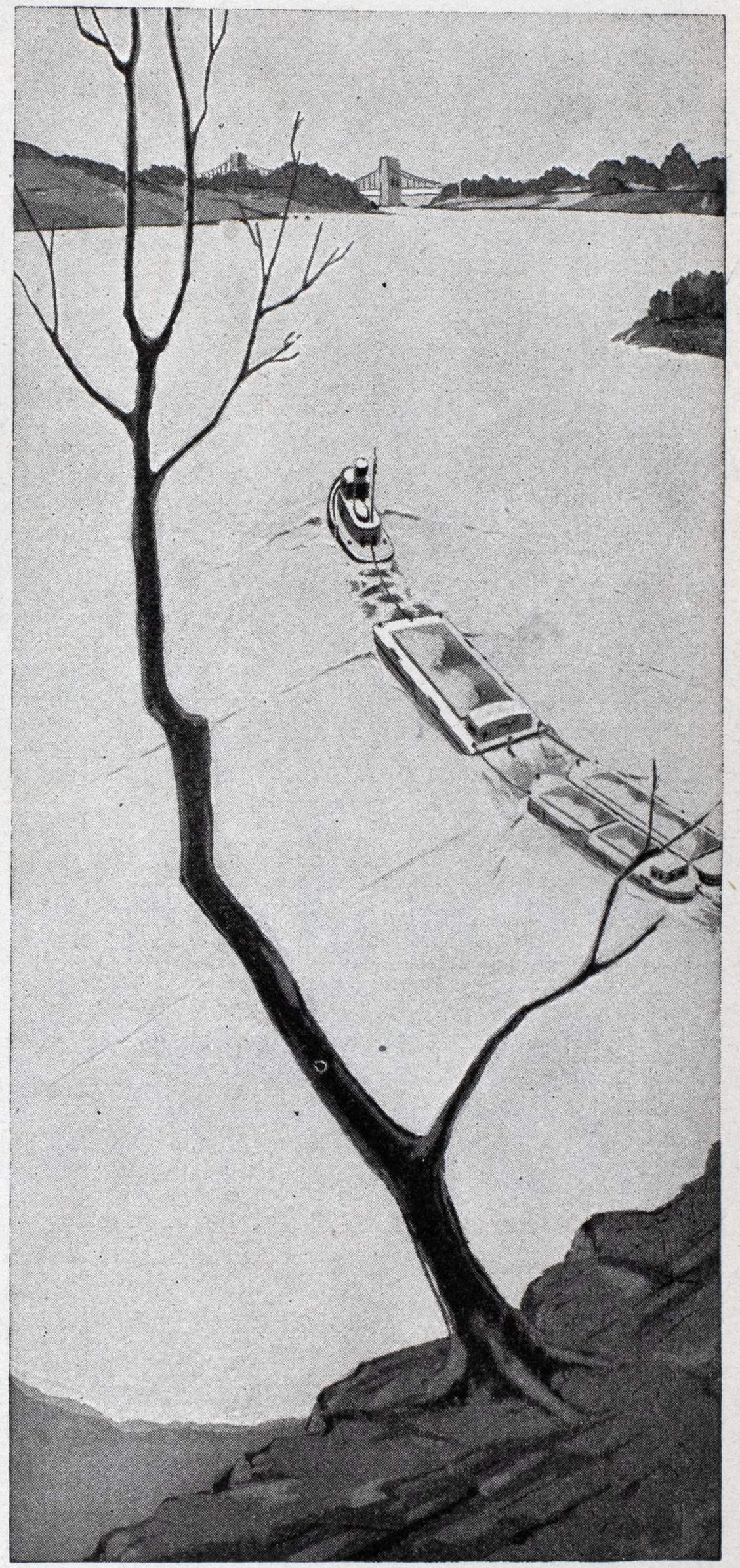


THE TINY TUG

DIESEL-ELECTRIC drive has given the tiny tug the strength of a giant. No useless churning of the water—only a relentless, indomitable strength as it grips its burden and forces its cargo to its destination.

For Diesel-electric power is flexible power, turning the propeller at speeds best calculated to perform its tasks with the greatest efficiency, and furnishing power for the auxiliaries. And that, in part, is the explanation of a well-defined preference for this form of drive on tugs, ferries, tankers, and boats of special type.

General Electric has coöperated in furnishing many vessels with Diesel-electric drive. And it is logical that the problems of marine electrification be brought to this organization, whose past accomplishments, sound engineering practice, and extensive facilities are evidence of its experience in this field.



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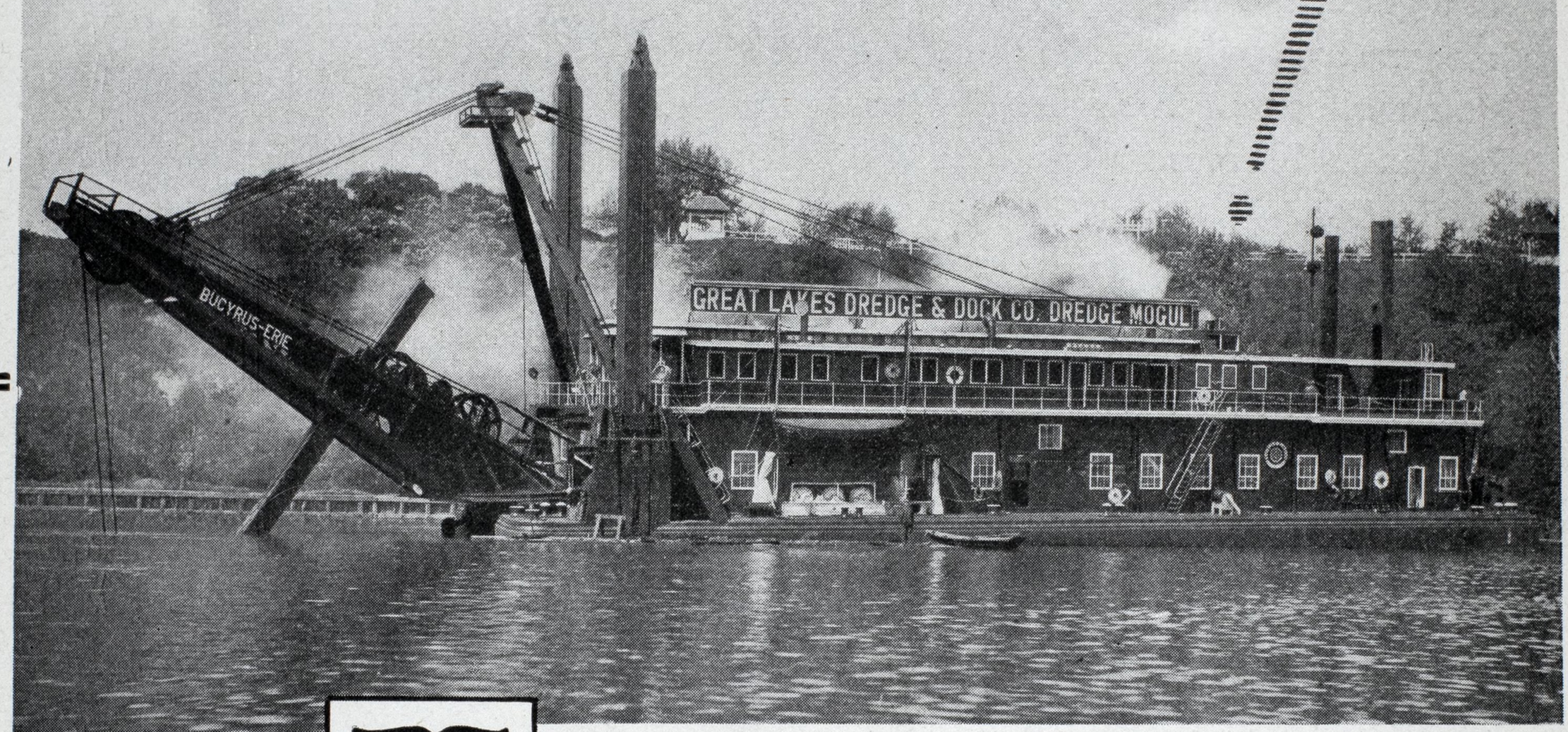


THE 8 cu. yd. Diesel Electric Dipper Dredge MOGUL was built for Great Lakes Dredge & Dock Co., Chicago. It is equipped with a 12 cu. yd. dipper for ordinary work but will heap up to a load of 16 yards in lighter materials. An 8 cu. yd. dipper is used for dredging rock. Maximum digging depth is 42 ft. of water. The MOGUL is 156′0″ x 42′6″ x 12′8″—1200 H.P., equipped with Bucyrus-Erie dredging machinery and Busch Sulzer Diesel engine. It has living quarters for a crew of twenty-three men.

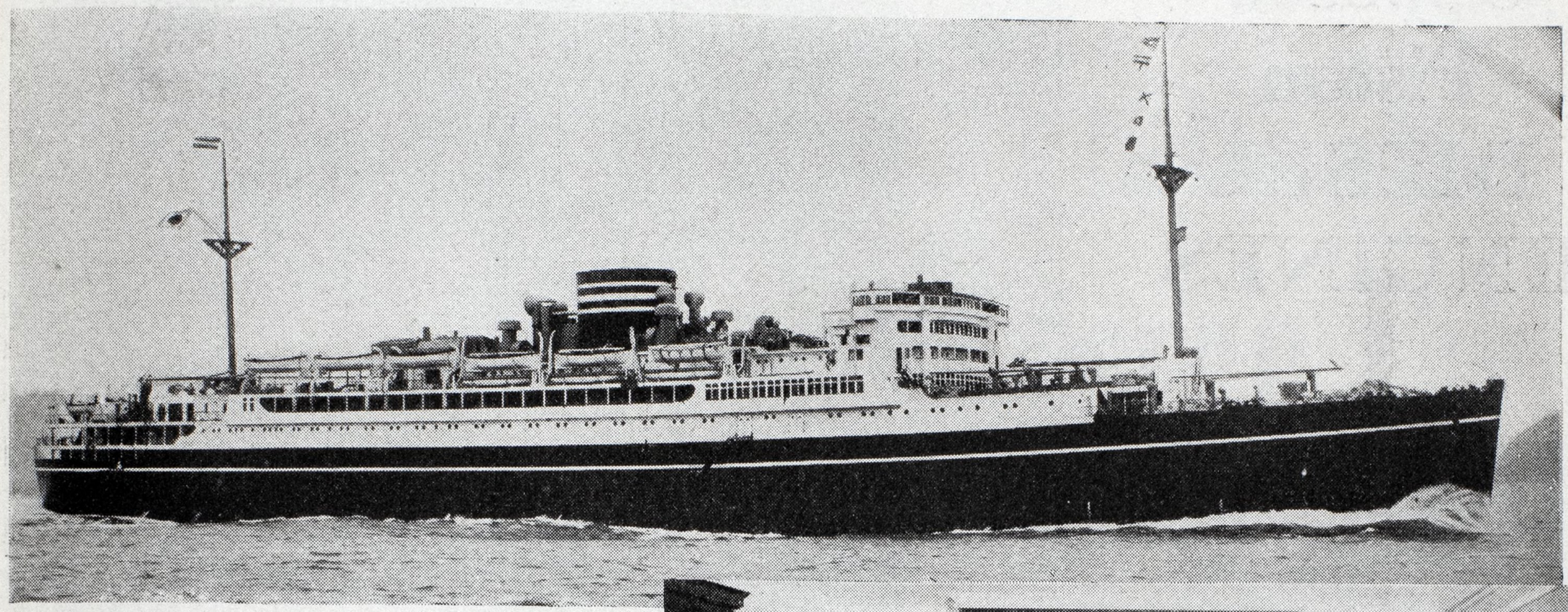
It will pay you to consult Manitowoc when in the market for dredges, steel passenger and freight vessels, carferries, tankers, fire boats, sand suckers, tugs, scows, lighters, marine engines, marine boilers, ship auxiliary equipment, etc.

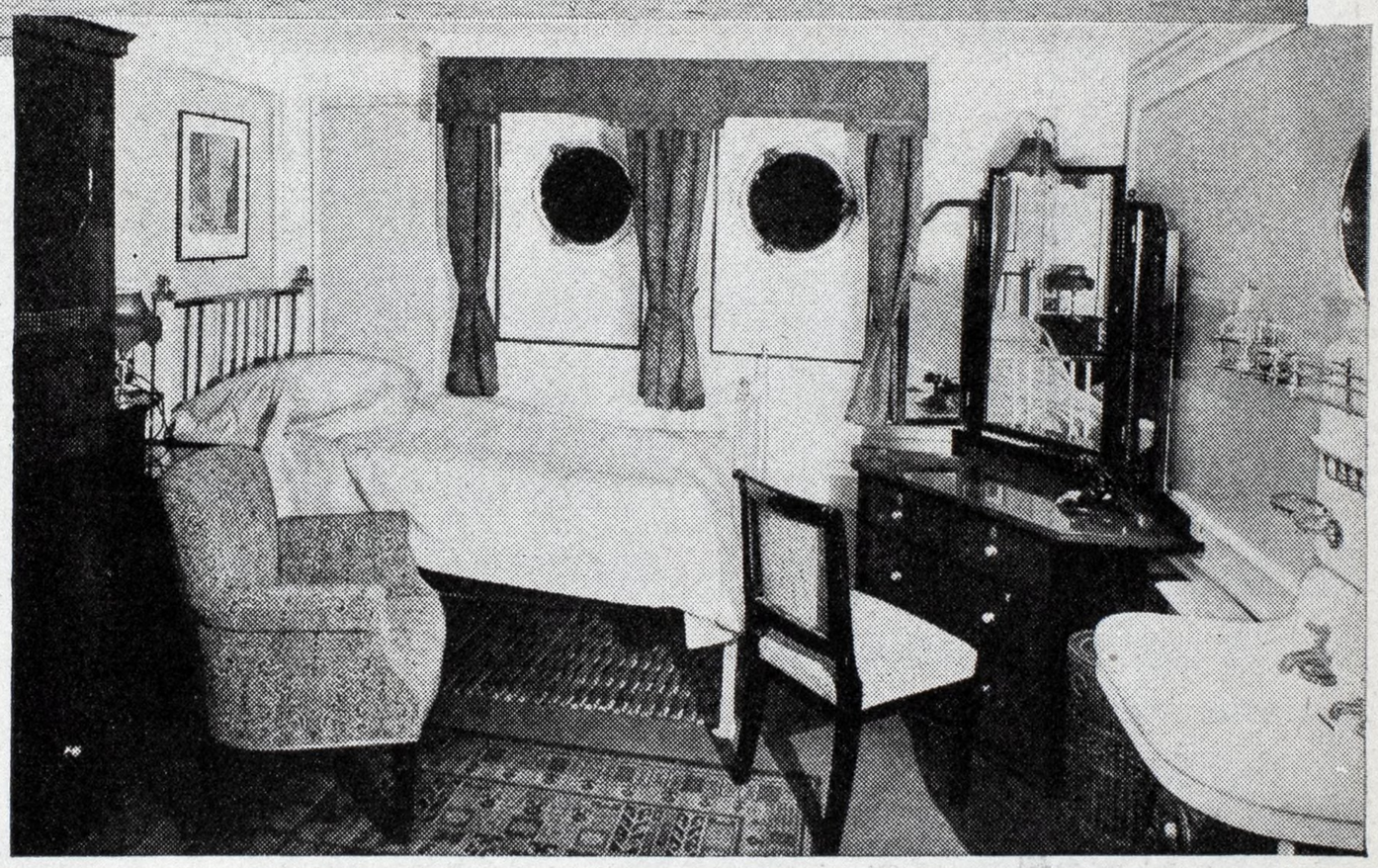
MANITOWOC SHIPBUILDING CORPORATION

Manitowoc, Wisconsin

In the race for public favor . . .

they choose this famous equipment





A typical stateroom equipped with Simmons Beautyrest Mattresses

The palatial new Chichibu Maru selects Simmons Beautyrest Mattresses

"SECOND OF THE THREE" new motor ships ordered by the N. Y. K. Line, the Chichibu Maru is a triumph of modern construction and comfort. Spacious public rooms, Roman pool, banking service, picture gallery . . . smooth, flowing power from twin Diesel engines . . . marvelous charm of decoration.

Simmons Beautyrest Mattresses were chosen for the capacious first cabins of this new liner. Comfortable as the beds in an exclusive hotel—or their own homes—passengers have been quick to praise the luxury of these "inner construction" mattresses.

Prestige is gained and maintenance costs are reduced when Simmons equipment is installed . . . for comfort and beauty are happily combined with marvelous durability.

We will help you prepare estimates, if you wish. Write to The Simmons Company, Contract Division, 666 Lake Shore Drive, Chicago, Illinois.

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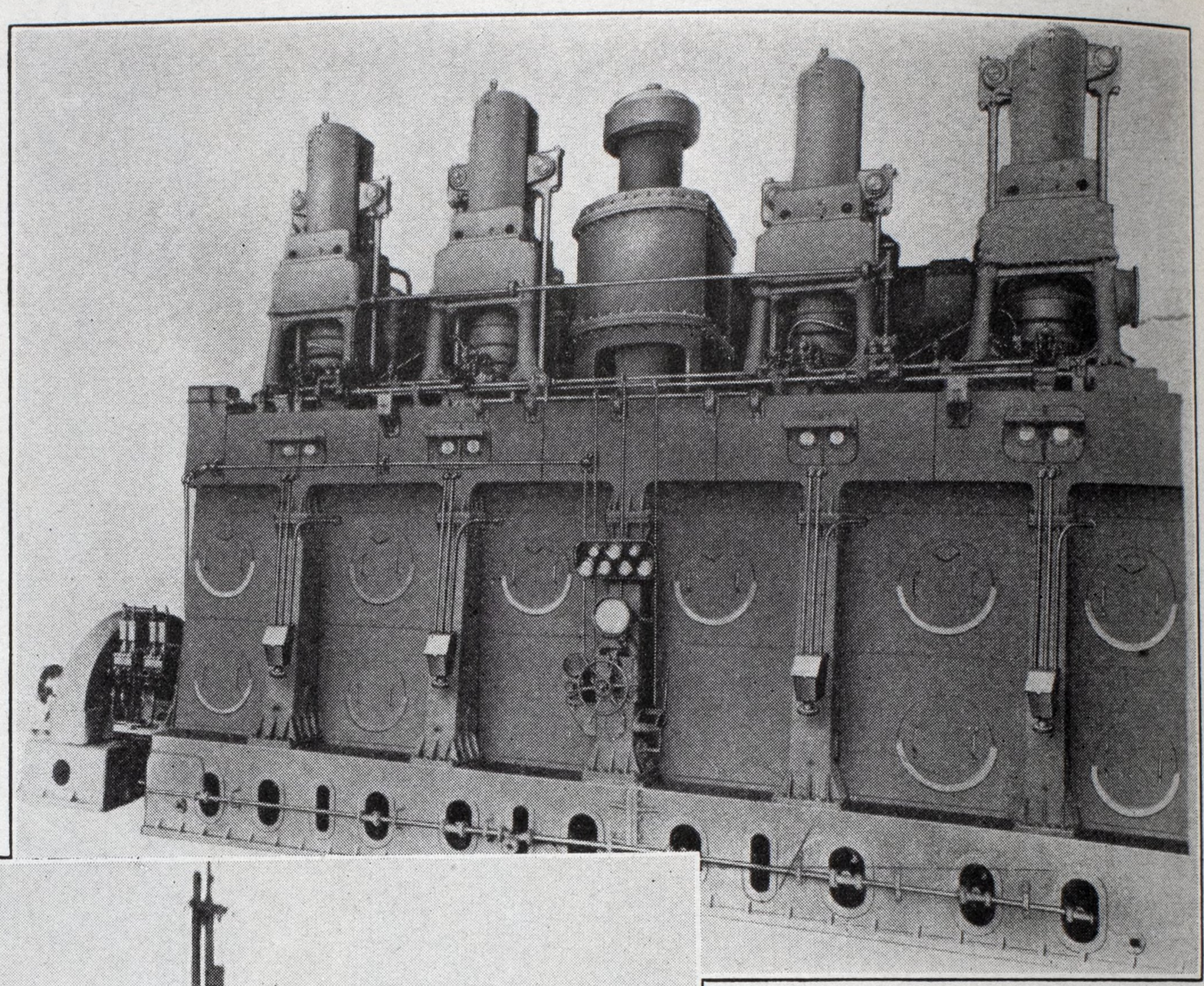
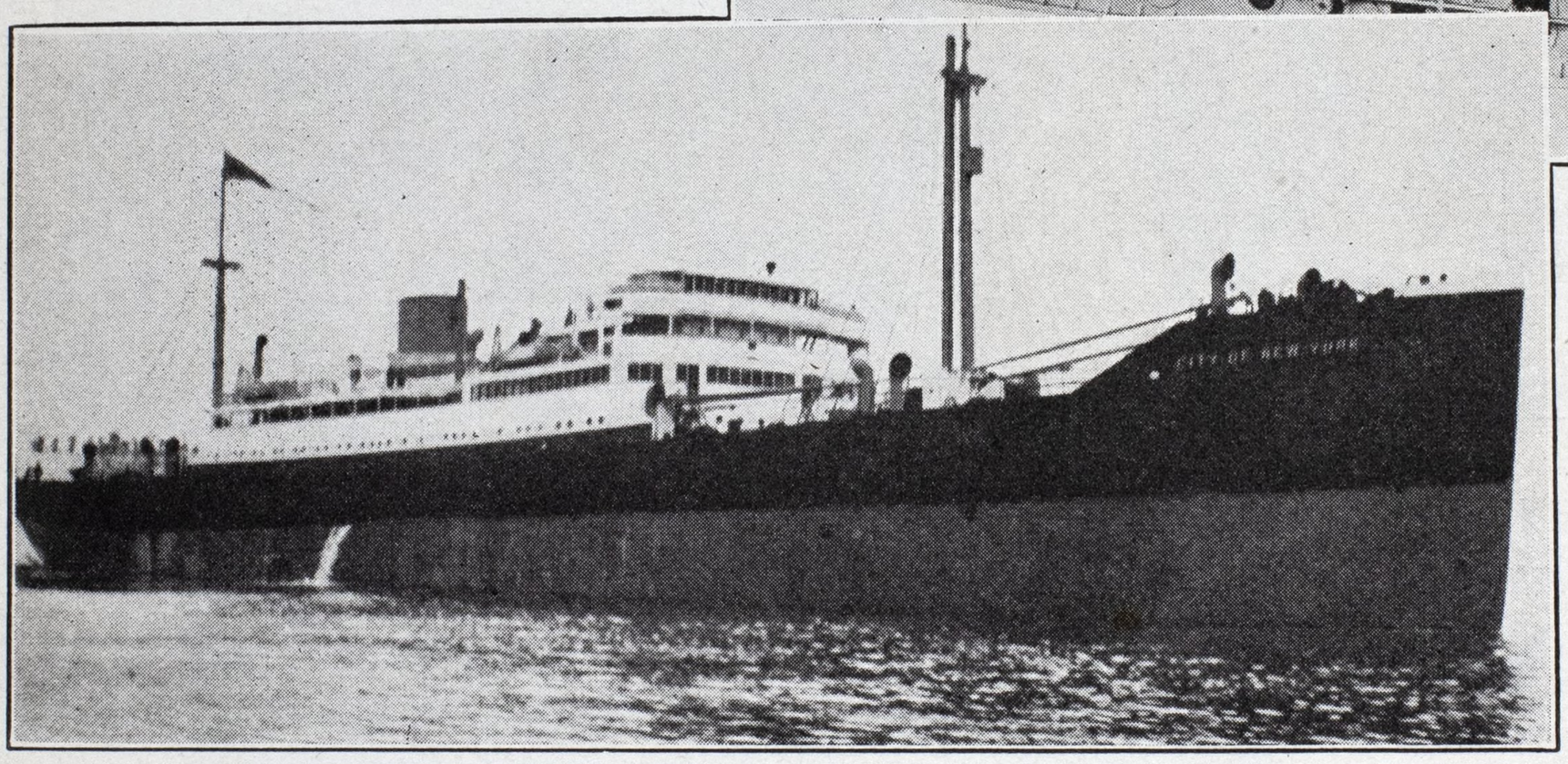
ENGINES





The Ms. City of New York, first big combination freight and passenger motorship built in America, is owned by the American South African Line. Her length is 470 ft. 8 in., deadweight capacity 9350 tons, first class passenger accommodation 60, power 5400 s.h.p. and speed 14 knots

Builders of

Passenger and Cargo Vessels—Oil Tankers

Unlimited facilities for

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Two floating Dry Docks
11,000 Tons Lifting Capacity Each

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NEW YORK

Take the Scrap Pile Off Your Payroll

MANUFACTURERS whose 1930 watchword is "Economy Everywhere" will find food for thought in the statement of an industrial corporation, world-famous for economical methods, that the value of the material it scraps equals one-half its annual labor cost.

In any industry, the commonest and most costly item of waste is machinery discarded because it is worn or damaged. It is in the reclamation of such machinery that oxy-acetylene welding can save money. Oxwelding is the only repair process that makes the parts repaired as strong as, or stronger than, they were when new.

Through regular use of oxwelding, scores of progressive manufacturers are saving from one hundred to one thousand dollars a month in replacement charges.

The process is simple, adaptable to hundreds of jobs. The equipment is surprisingly low in cost. If your program does not already include oxwelding, it will pay to investigate this process today.

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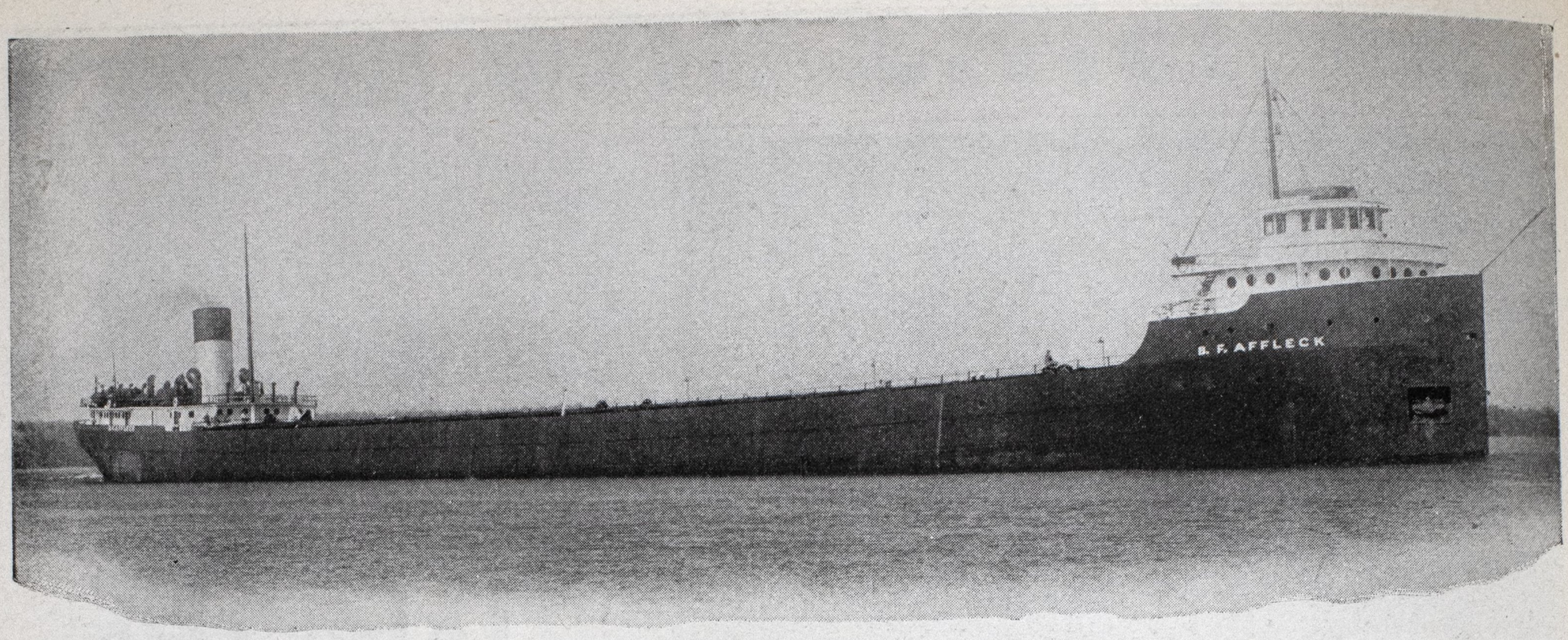
Units of UNION CARBIDE AND CARBON CORPORATION

General Offices...New York UCC Sales Offices...In the Principal Cities

65 Linde plants, 48 Prest-O-Lite plants, 174 Oxygen Warehouse stocks, 156 Acetylene Warehouse stocks
42 Apparatus Warehouse stocks, 245 Union Carbide Warehouse stocks



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Finest Type of Great Lakes Cargo Carrier

S.S. B. F. Affleck owned and operated by the Pittsburgh Steamship Company, is a single deck bulk cargo vessel of the standard type built for the iron ore, coal and stone trade of the Great Lakes. Her molded dimensions are: Length overall, 604 feet, length between perpendiculars, 580 feet; width 60 feet and depth 32 feet. Capacity 12,000 tons.

A diversified experience, covering the construction of all types of ships, fully qualifies us to meet *your* requirements thoroughly and with despatch.

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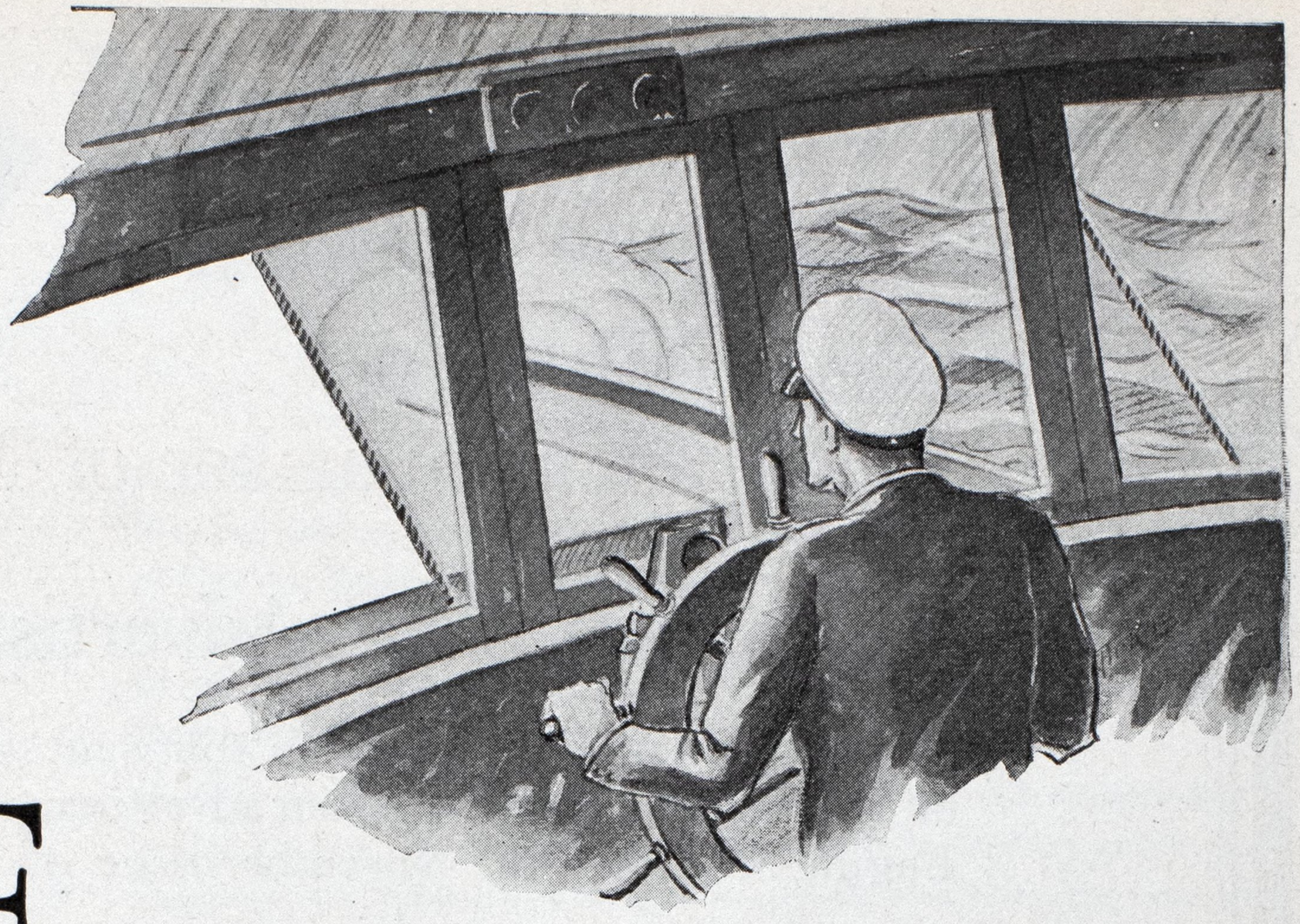
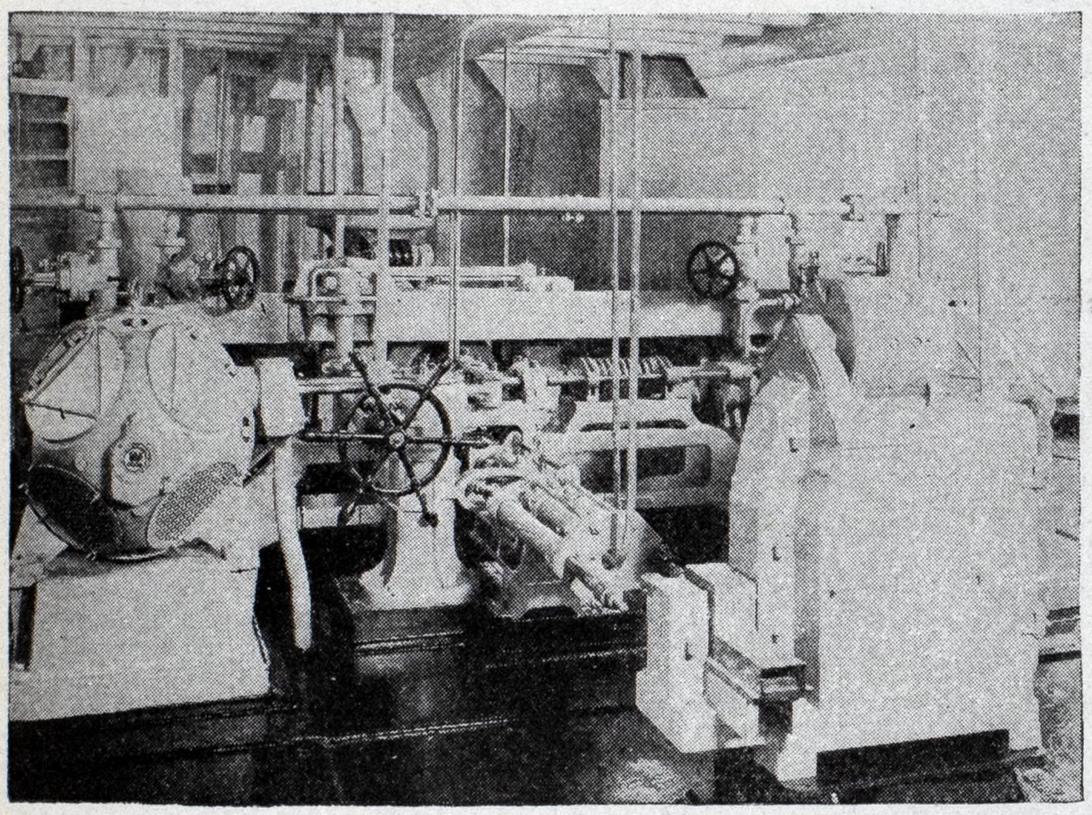


ELECTRICITY

--answers
the hand at the wheel



Electric-driven steering gear of motor liner City of New York.

ABEAM sea! The rudder swings from hard-over to hard-over to keep the ship on her course. Green mountains of water hammer at the weather side creating difficult steering conditions.

In storms on open sea or in the calm of harbor waters, Westinghouse motors and controls unfailingly answer the hand on the wheel of a ship, be it liner or yacht.

They are used also, to drive all other deck and under-deck auxiliaries on many types of vessels in all classes of service.

Service, prompt and efficient, in all principal American ports

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COMING!

Diesel Engine Number of Marine Review

Prepare Your Advertising Now!

If you have a product or service you want to bring to the attention of Marine Men make sure your advertisement appears in the Diesel Engine Section of the November issue of MARINE REVIEW.

Diesel Engine Section Annual Feature

To focus the minds of responsible men in the shipping business on the applications of diesel engines, MARINE REVIEW every year devotes a two color section in its November issue exclusively to diesel propulsion. Because it contains accurate, definite information on a large number of different types of vessels, this November Diesel Engine Number is widely read by steamship owners, managers and operators, naval architects and marine engineers, who subscribe regularly to MARINE REVIEW.

American marine diesel engines and auxiliaries are completely described and illustrated. A full editorial page is utilized for each engine together with a picture and data of each ship in which that particular engine is installed. The section is printed on india stock in blue and green.

The November Diesel Engine Number will be distributed to all important marine men while many of them are giving serious consideration to new shipbuilding and conversions of present ships. It will give to these men the only complete diesel engine data of its kind to be found anywhere under one cover.

This issue has been built up over a period of years as a reference directory of diesel engines and their direct applications. The advertising value is everywhere recognized.

Time rolls around very quickly, so we urge you to make your space reservation at once. Forms close October 20th.

Marine Review

220 Broadway
New York City

Penton Building
Cleveland, Ohio

5 YEARS *of* TOWING

without a single failure or major repair

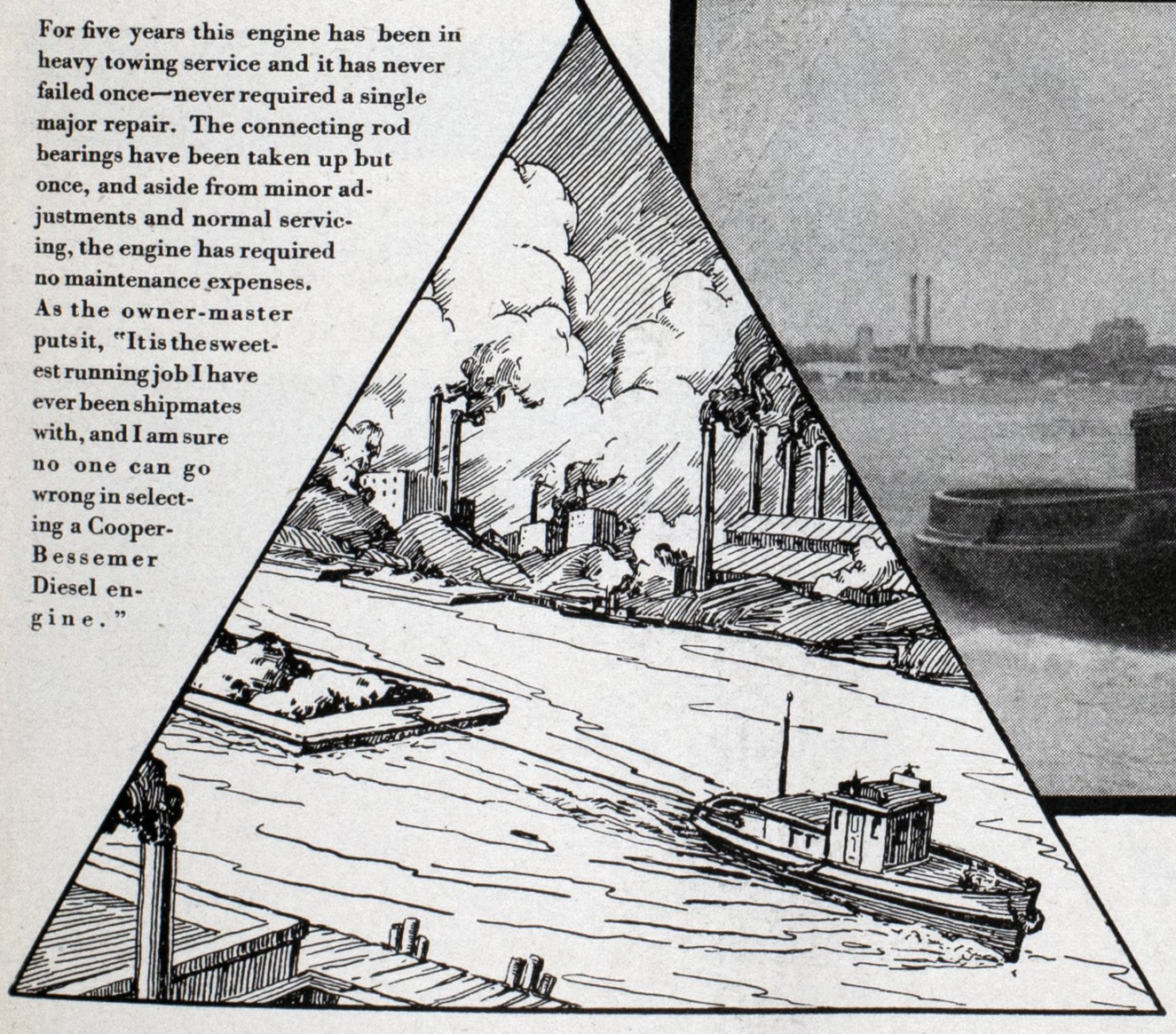
In June, 1925, a Cooper-Bessemer Diesel engine was installed in the tug George Wilds, owned and captained by Clarence M. Wilds of Detroit, Michigan. For the past five years this engine has been steadily engaged in heavy towing service, and during its entire career it *has never failed once*, and *has never required a single major repair.*

Such performance is by no means the exception with Cooper-Bessemer Diesels. Scores of these engines in tugs, tankers, towboats, cargo vessels, fishing vessels and every other conceivable type of marine service are continually demonstrating their unsurpassed economy, reliability and endurance.

Men who go down to the sea for profit know from experience that a Cooper-Bessemer Diesel is the best of shipmates. Built in a range of sizes and types ranging from 60 H. P. to 1500 H. P., there is a Cooper-Bessemer for every marine need. Write for complete details, specifications and performance data.

The Diesel tug George Wilds measures 45′x11′6″ x 5′6″. Her 60 H. P. Cooper-Bessemer Diesel engine swings a 36 x 34 pitch, 3 blade wheel at 400 R. P. M., giving the George Wilds a speed of 9 M. P. H. At full speed, full load the engine consumes but 3½ gal. of fuel oil per hour, and operates at a cost of $4.00 per ten-hour day (fuel and lubricating oil cost.)

For five years this engine has been in heavy towing service and it has never failed once—never required a single major repair. The connecting rod bearings have been taken up but once, and aside from minor adjustments and normal servicing, the engine has required no maintenance expenses. As the owner-master puts it, "It is the sweetest running job I have ever been shipmates with, and I am sure no one can go wrong in selecting a Cooper-Bessemer Diesel engine."



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DIESEL MARINE ENGINES

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Complete Shipbuilding Dry Dock and Repair Facilities

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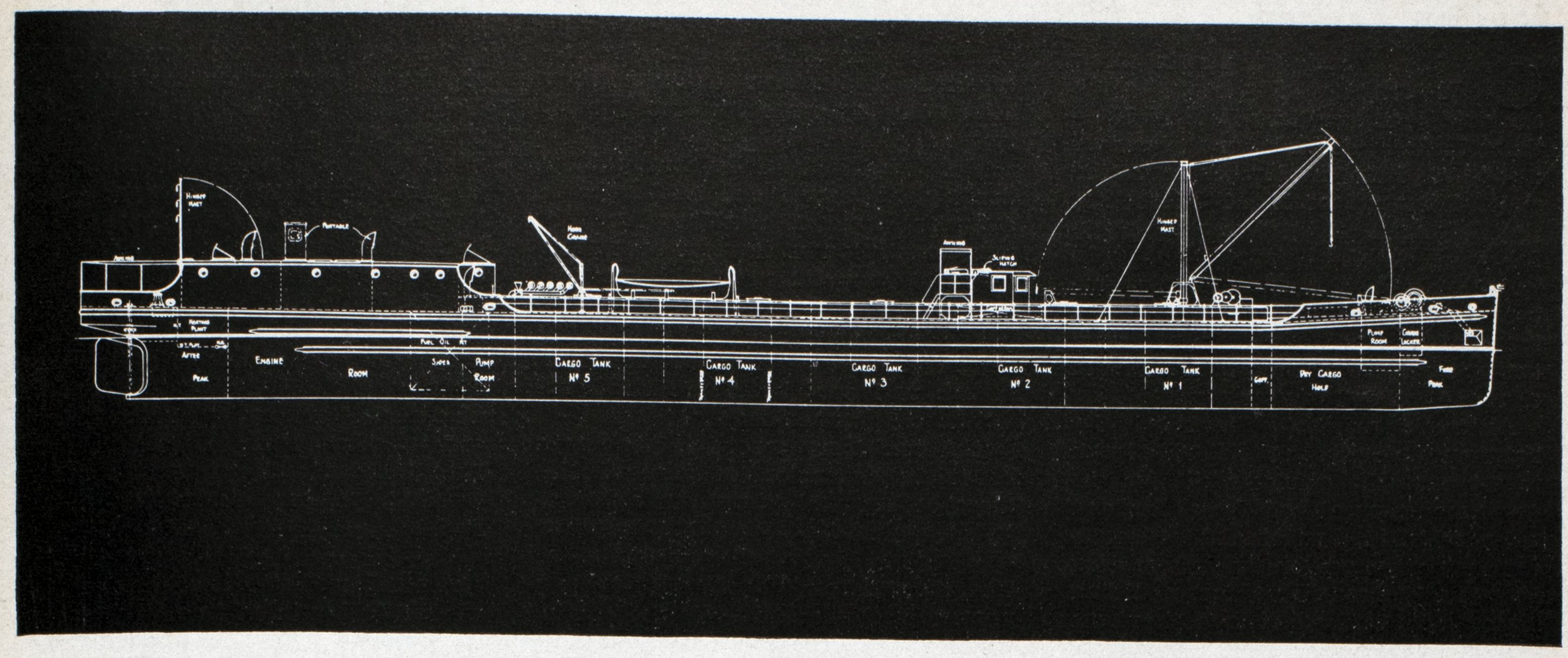
ONE OF THE TWO NEW OIL BARGES BEING BUILT FOR THE GULF REFINING CO.
POWERED BY NELSECO-DIESEL ENGINES.



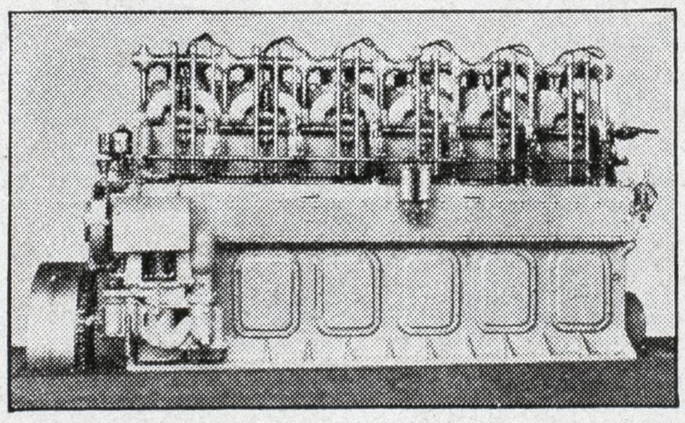
Nelseco powers two additions to the Gulf Refining Fleet

One of the most efficiently managed, nation-wide oil companies recognizes the economical and reliable service rendered by a Nelseco Diesel. Four 350-B. P. H., Type 6 MIR-18 engines have been selected to power two new oil barges of the Gulf Refining Company, which are now being built by the Bethlehem Shipbuilding Corporation, at their Sparrows Point plant near Baltimore, Maryland.

Both vessels which are of the self-propelled twin-screw type, will have a length of 212 feet between perpendiculars, 37 foot beam, 13 ft. 9 in. depth and 11 ft. draft. They will maintain a speed of 9½ knots. The total carrying capacity will accommodate 10,500 barrels of refined products.

Each is designed on the Isherwood bracketless system. They are being built to the design and under the direction of Mr. James Kennedy, General Manager of the Marine Department, the Gulf Refining Company.

Scheduled for delivery in 6 months, these boats will be operated on the New York State Barge Canal and in coastwise service. Their Nelseco equipment prepares them for hard and constant usage.



Type 6 MIR-18, 350-B. H. P., 280 R. P. M., 6 cylinder, 4 cycle; mechanical injection; direct reversible, Nelseco-Diesel engines.

The 1930 Nelseco Diesel engines include a wide variety of models for all types of towboats, passenger, freight and fishing vessels. We shall be glad to send you complete information. Write for Catalog MR.

ELECTRIC BOAT COMPANY

NEW LONDON SHIP AND ENGINE WORKS, GROTON, CONN., U. S. A.

New York Sales Offices: 247 Park Avenue, New York City

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MORAN equipment is entirely adequate to simplify the most intricate undertaking of ship-handling or towing.

The result: a satisfaction from the Service received far beyond the ordinary.

The elements of prompt delivery — dependable, supervised personnel — logical costs — all have contributed to the satisfactory cooperation of this Organization with the most prominent industrialists and marine owners and operators in the Port of New York for three generations.

OVER SIXTY-EIGHT YEARS IN SERVICE

Day and Night Service Every Day and Night in the Year.

A Moran executive is always available.

MORAN TOWING AND TRANSPORTATION COMPANY, INC.

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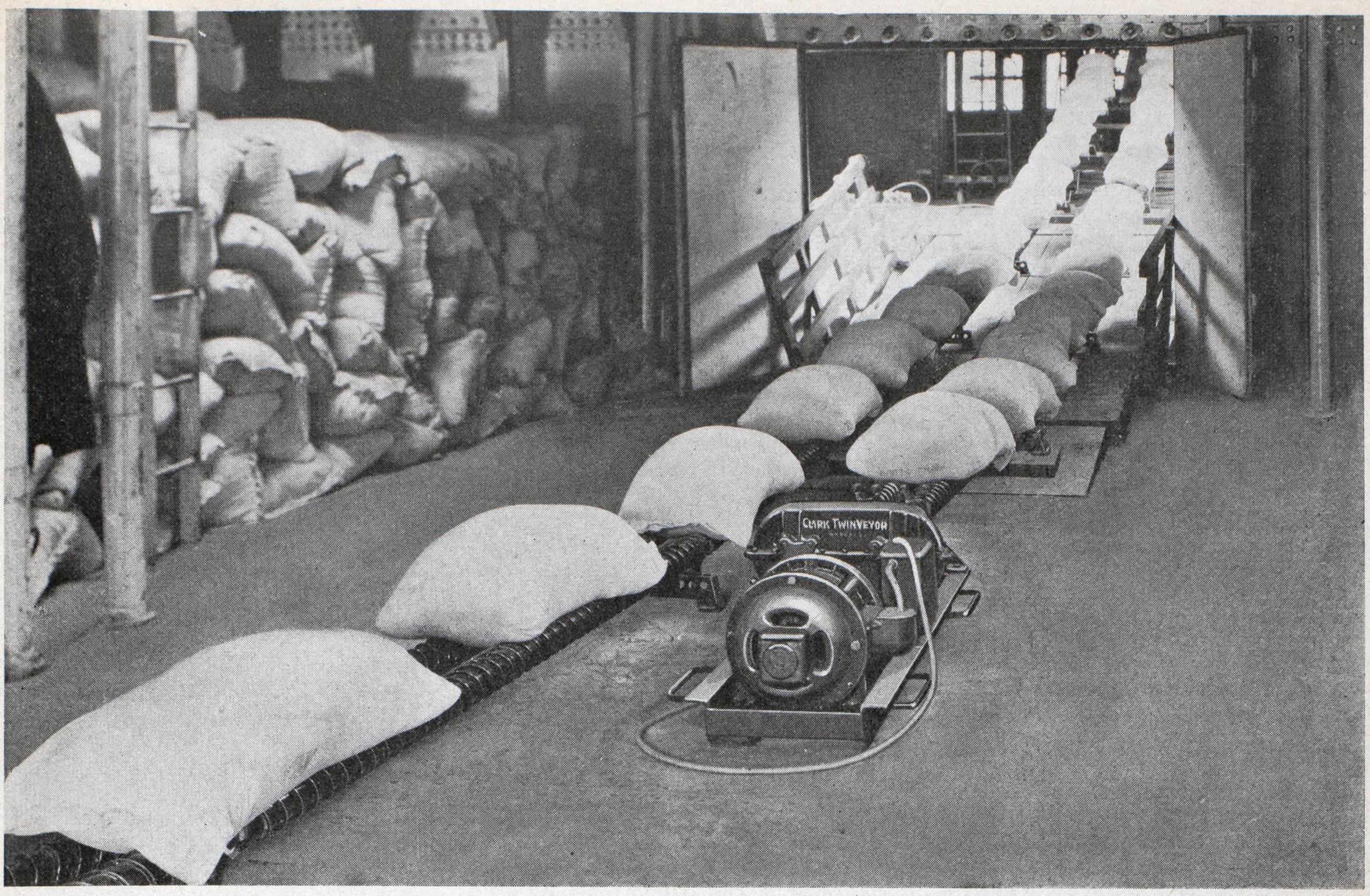


Unloading flour. These two "TwinVeyor" lines empty the boat in a hurry:—150 tons an hour.

CLARK "TWINVEYOR"

is producing strange new figures of cargo-handling costs

It gets the stuff out of the ship, into the warehouse, *fast*. Carries the cargo where it's to be piled and piles it. Carries bagged sugar, for instance, up a 30% grade, 90 ft. per min., 1500 to 1800 bags per hour.

The equipment is simple—a power head (cord plugged into nearest current receptable) turns two external spiral tubes toward each other. Pairs of tubes assembled in 8 ft. sections, locked together with universal joints. Push the button—the TwinVeyor starts instantly and transports any bagged material as fast as the bags can be fed to the tubes. Suitable for handling cargo in bundles, bales, crates. Capable of indefinite extension. Makes right and left turns.

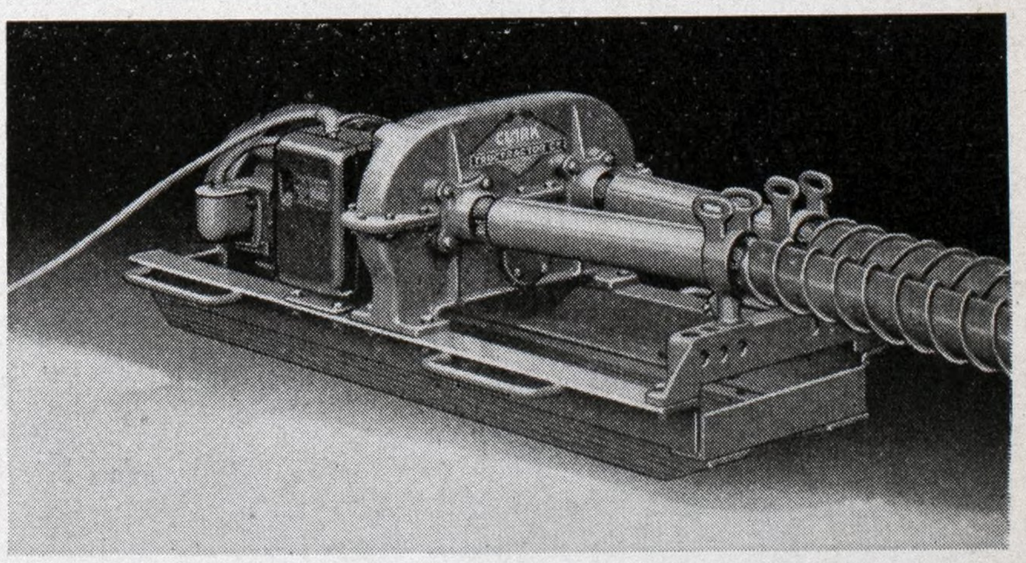
Clark "TwinVeyor" has hung up some loading and unloading cost figures that look strange—they're low.

Write for new bulletin on the Clark "TwinVeyor"—just off the press.

The Clark Tructractor Co.
Battle Creek, Mich.

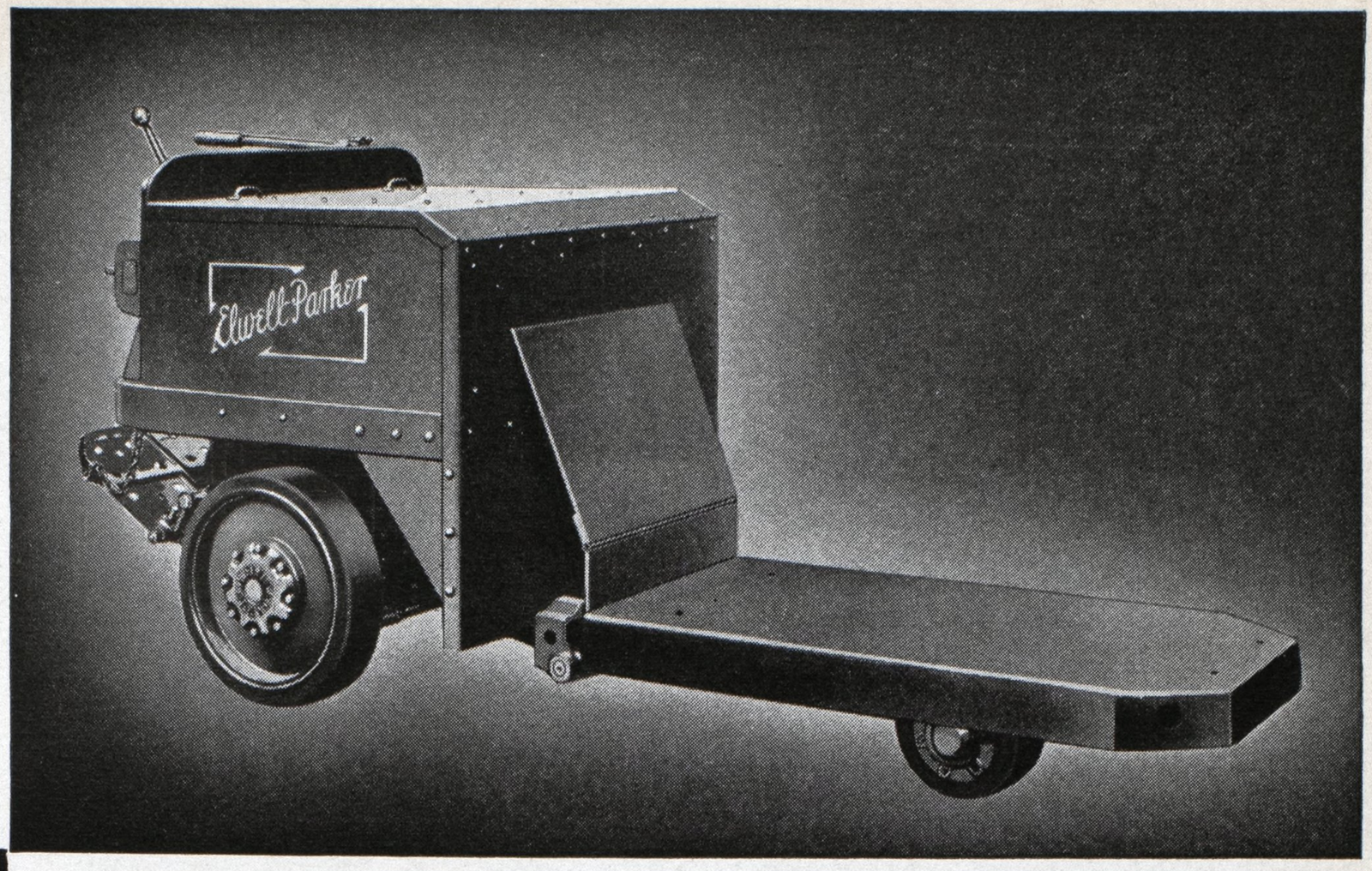
Attach this ADVERTISEMENT to your inquiry

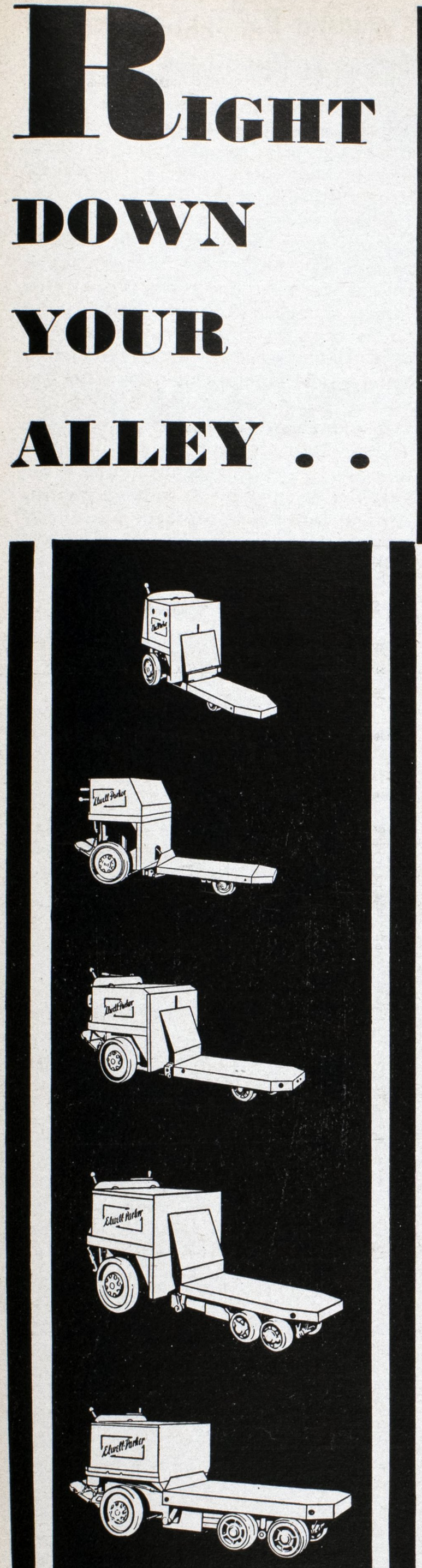
CLARK TRUCTRACTOR Co. BATTLE CREEK



Power head of the "TwinVeyor"—easily shifted about.

RIGHT DOWN YOUR ALLEY . .





Whatever Your Requirements

WHETHER you are making your first lift truck installation . . . or rounding out a complete lift truck-skid handling system, Elwell-Parker is prepared to supply your needs.

From the most complete line of types and sizes, you can choose the trucks that best meet your requirements.

In an Elwell-Parker, thorough engineering and a liberal placement of heat treated alloy steels at vital points has made it possible to eliminate power-wasting weight and to increase the safety factor. Low center of gravity and the simplest lift unit ever built in a lift truck are among other advantages.

Operators prefer Elwell-Parkers because of their *live* power, ease of operation and exclusive safety control features. Experienced management specifies them again and again because of their lower operating and maintenance cost and their longer production life.

Elwell-Parker Field Engineers throughout the country have access to the newest methods of handling now in use. They will bring you information which you do not have time to gather yourself. They will help you work out the most economical handling system for your plant. Ask them for details or write direct.

SHIP ON SKIDS

Elwell·Parker

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Designers and Builders of Electric Industrial Trucks, Tractors and Cranes for 24 Years

UP AGAIN
goes the LIFE *of* EXIDE
Ironclad batteries

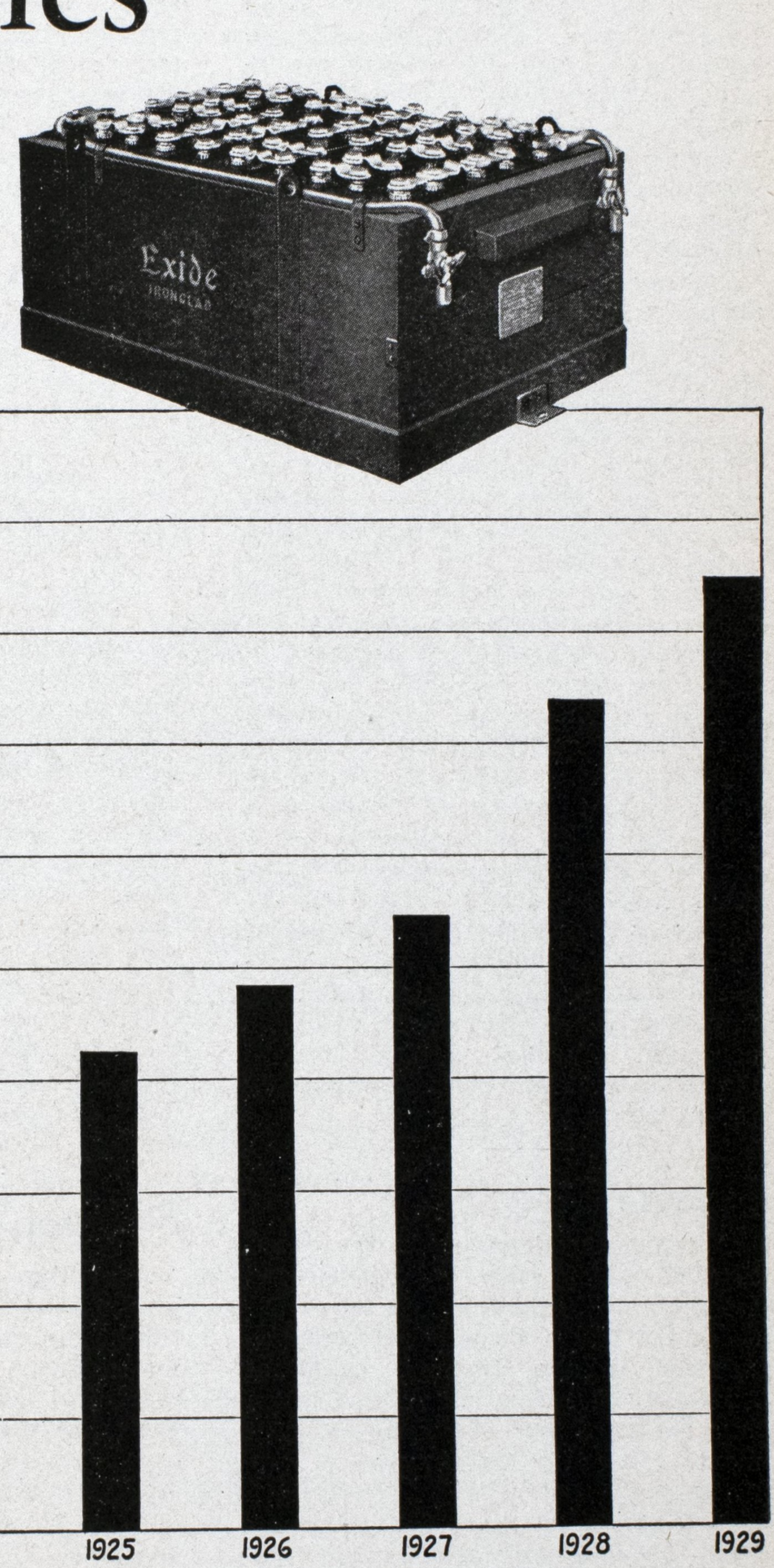
THE average life of Exide-Ironclad industrial truck batteries renewed during the year 1929, again showed an increase over the highest previous year's record.

Constant improvements in design and construction have resulted in an increase in the service life delivered by Exide-Ironclad Batteries for six consecutive years, and a total increase of 42.4% over the period. (Based on actual service records of batteries renewed.)

This means more battery for the money, and lower battery costs, as this increased life and greater durability have been obtained at no increase in prices.

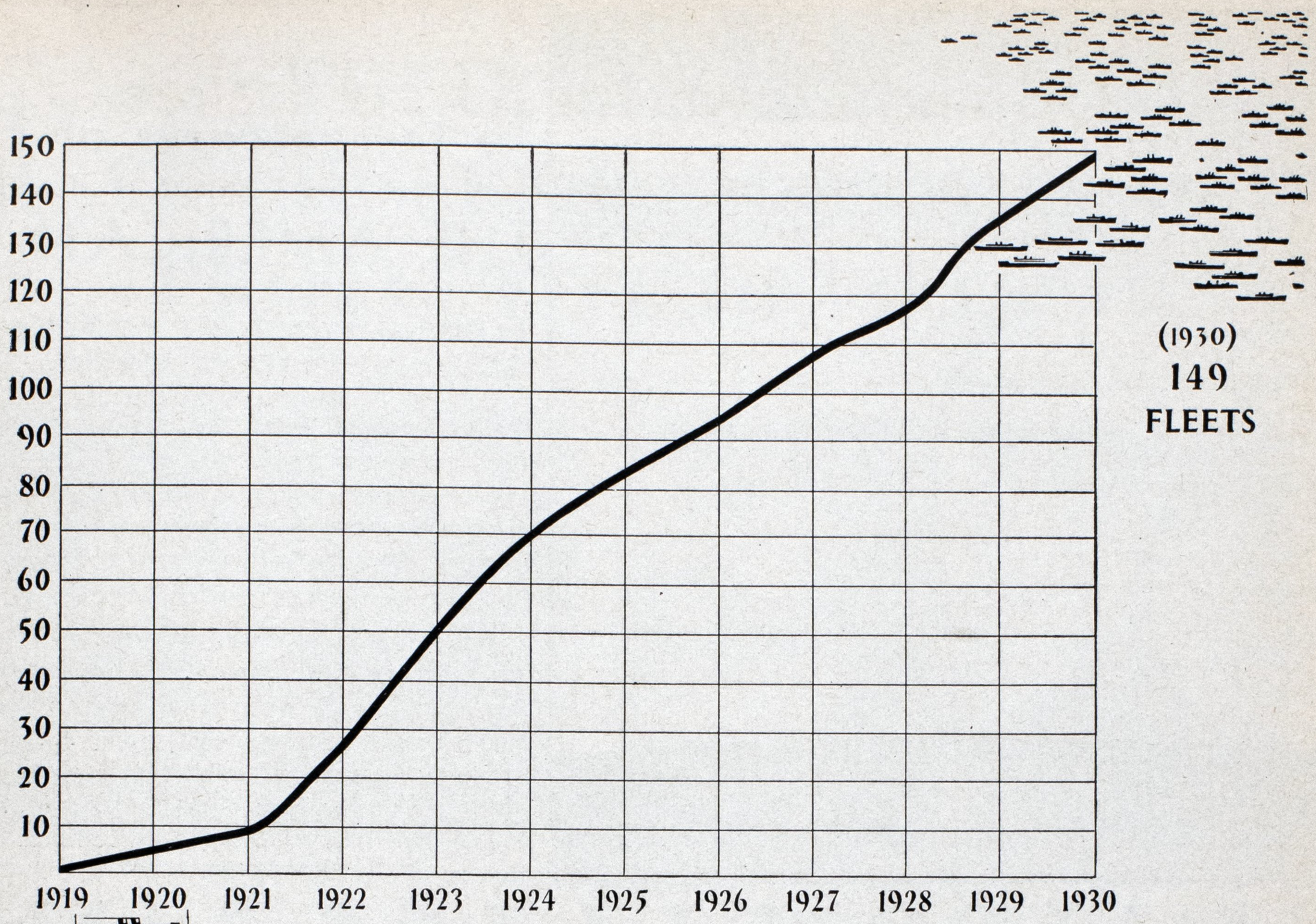
Such improvement in any product merits consideration. When you next need a battery, buy an Exide-Ironclad.

Exide
IRONCLAD
BATTERIES



A 42.4% INCREASE IN LIFE IN SIX YEARS!
This chart shows how constant improvements in construction have resulted in a steadily increased life in Exide-Ironclad Batteries

THE ELECTRIC STORAGE BATTERY COMPANY, Philadelphia
THE WORLD'S LARGEST MANUFACTURERS OF STORAGE BATTERIES FOR EVERY PURPOSE
Exide Batteries of Canada, Limited, Toronto



THE CURVE OF PROGRESS CONTINUES SHARPLY UPWARD

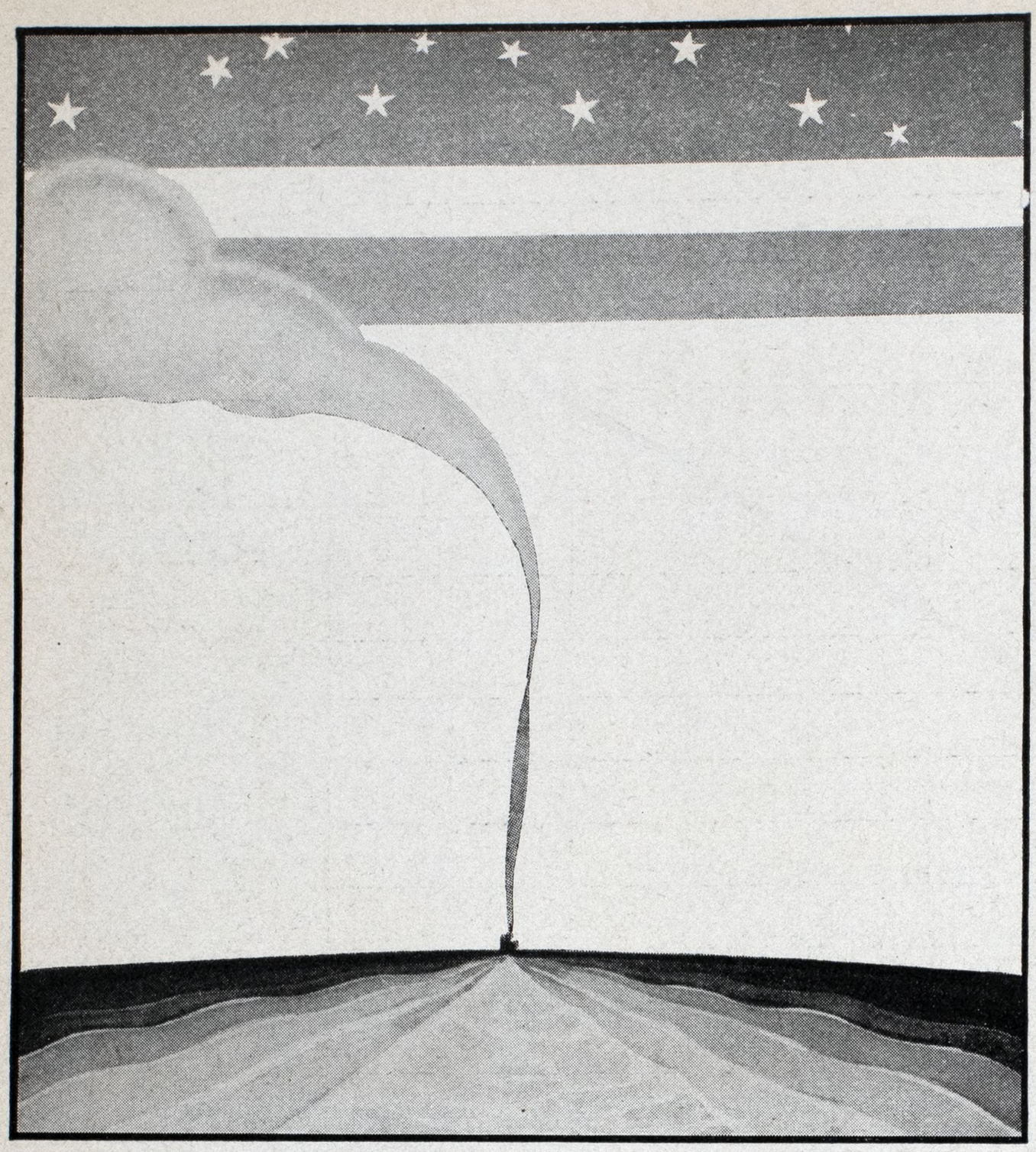
DURING the past year thirteen fleets have been added to the already large list of those using the Sperry Gyro-Compass. This brings the total number of fleets using the Sperry Gyro-Compass to 149.

Ship operators are unanimous in their high regard for this machine which has done so much to make it possible for the master of a vessel to perform his duties of conducting his ship from port to port with a degree of safety and navigational economy never before believed possible.

This rapid adoption of the Sperry Gyro-Compass is not alone confined to the larger ships but extends to all classes including survey vessels, ferries, yachts, tow boats, dredges, and passenger and freight vessels of every type.

SPERRY GYROSCOPE CO., INC.

BROOKLYN NEW YORK



To the gateways of Europe

THE AMERICAN WAY

The American way means your own living standards . . . stewards who speak your own language . . . food to which you've been long accustomed, friendly to your diet . . . and niceties in appointments that are exclusively American. Hence, when you cross to Europe on an American ship, it's precisely as though you were going to sea on a smart metropolitan hotel. And when you ship the American way the same efficiency that you know at home protects your shipment and earns you your full measure of profit.

To sail and ship the American way take the Leviathan, World's largest ship . . . one of five splendid United States Lines liners, George Washington, America, Republic, President Roosevelt and President Harding . . . or one of the five sturdy ships of the American Merchant Lines—sailing weekly from New York direct to London . . . American Shipper, American Merchant, American Banker, American Trader and American Farmer.

UNITED STATES LINES

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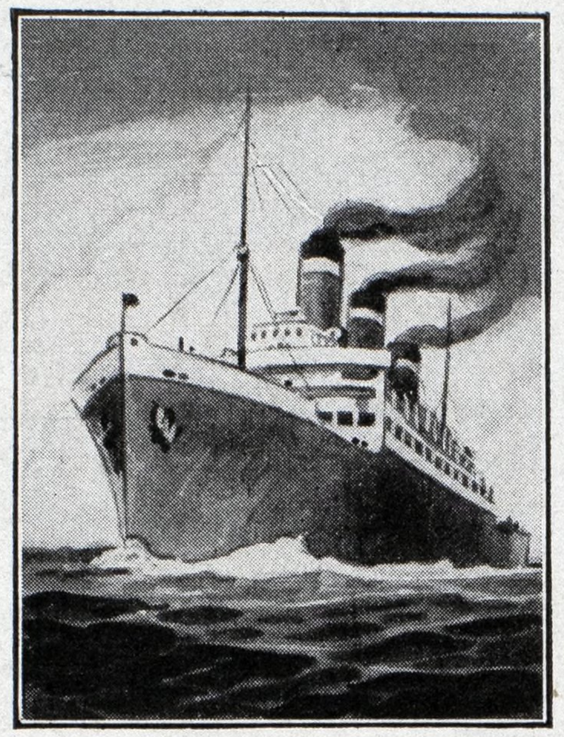
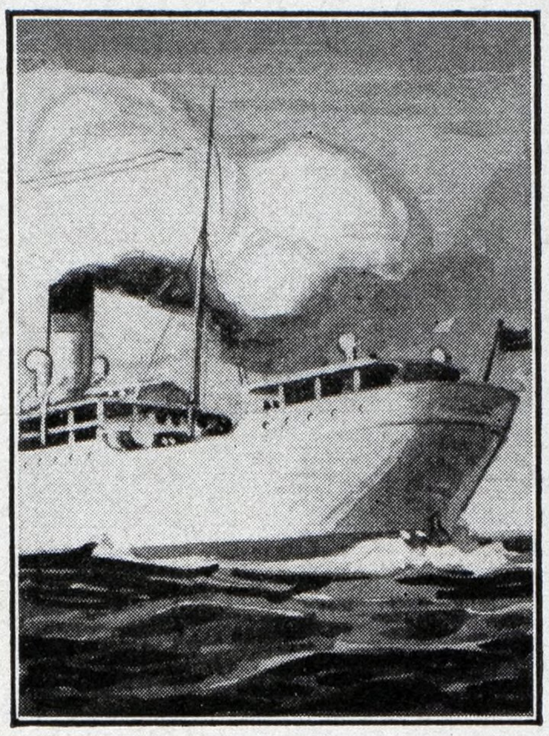
The marine industry is of tremendous importance as a market for your products and service.

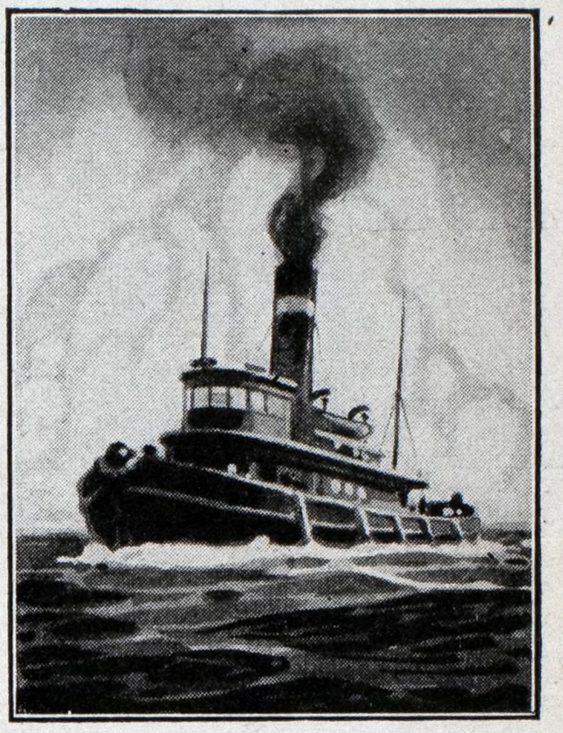
Marine Review can assist you in securing better sales returns. It is subscribed for by more steamship executives and ship operating officers than any other marine publication. Further, Marine Review gives you complete coverage of the shipyards as virtually every one of them subscribe for one or more copies.

Be sure to include Marine Review in your sales and advertising plans to reach the really important men who say yes, and O. K. requisitions in the marine trade.

THEIR OWNERS HAVE CHOSEN THE GREATEST PROTECTIVE DEVICES







Complete installations of RCA *Equipment make these ships noteworthy*

RADIO brings to ship owners a new protection . . . perfected by the vast research, engineering and manufacturing facilities of Radiomarine Corporation of America . . . thus enabling owners and agents to keep in constant touch with their vessels.

Radiomarine Service is declared by owners and navigators to be today's greatest factor in safety at sea because it enables every ship to combat all storm conditions better . . . rain, fog, snow, sleet or wind.

Also Radiomarine Service maintains the world's greatest system, for shore to ship communication . . . a complete, reliable, efficient and economical service.

With such leadership as this, is it any wonder that Radiomarine Service has won its high reputation in the marine world.

Complete RCA Service includes

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2 *Service on equipment*—Regular inspections at any of seventeen ports; maintaining at principal ports stocks of spare parts for repairs and renewals.

3 *Operators*—Detailing of experienced operator personnel to the ships.

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New York	Savannah	Buffalo	Los Angeles
Philadelphia	New Orleans	Cleveland	San Francisco
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OF AMERICA
(A Subsidiary of Radio Corporation of America)
66 BROAD STREET
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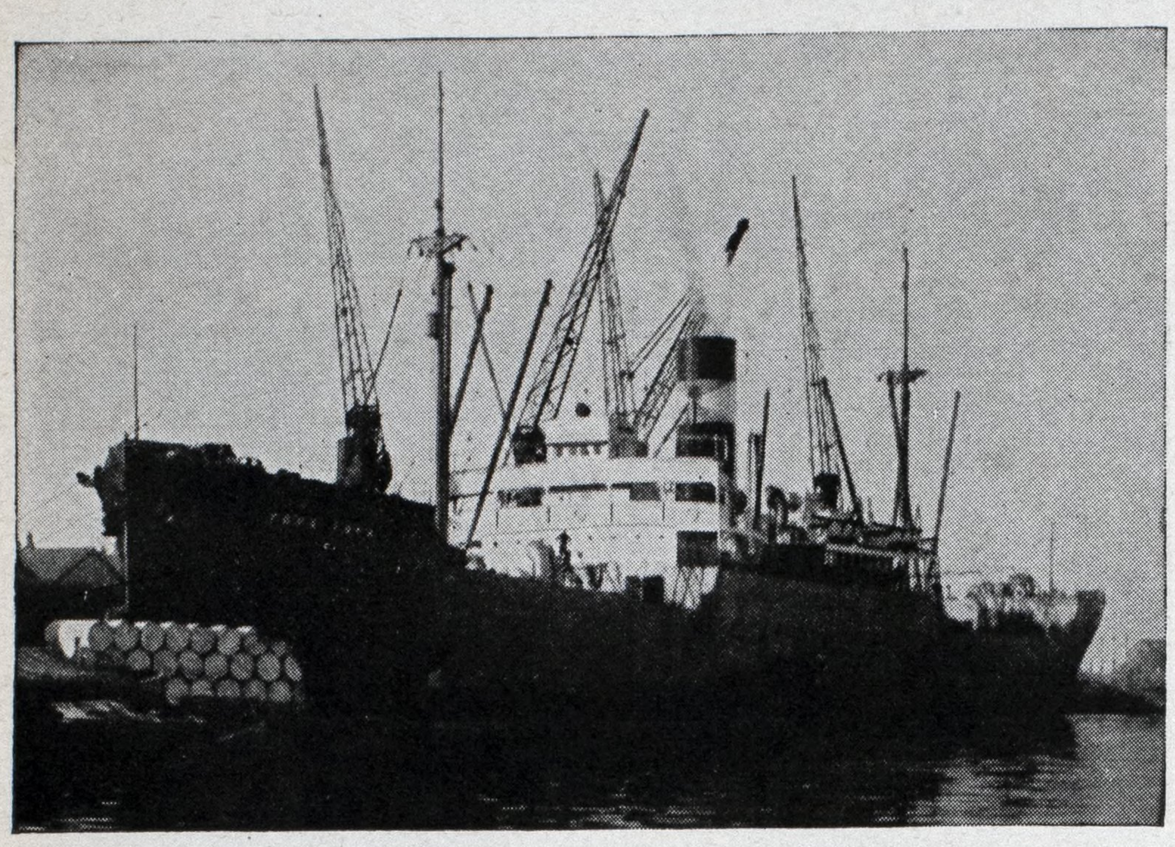
This PEACE-TIME FLEET Extends a Nation's Markets



An American vessel discharging meal, zinc and lumber at Bristol

MODERN production speed is causing American industry to seek new outlets. Countries in all parts of the world are displaying eager receptiveness to American-made goods of every description. And a speedy, economical route to these markets is offered by our great new American Merchant Marine.

Sailing promptly from Atlantic and Gulf ports, are the hundreds of dependable craft of the 16 lines owned by the United States Shipping Board, as well as those in the many other lines developed by it, but now under private ownership.

The splendid service rendered by them begins even before your merchandise goes aboard. For the authoritative advisory facilities of the American operators listed here will prove of utmost value in solving all problems pertaining to foreign trade expansion. Write for full information.

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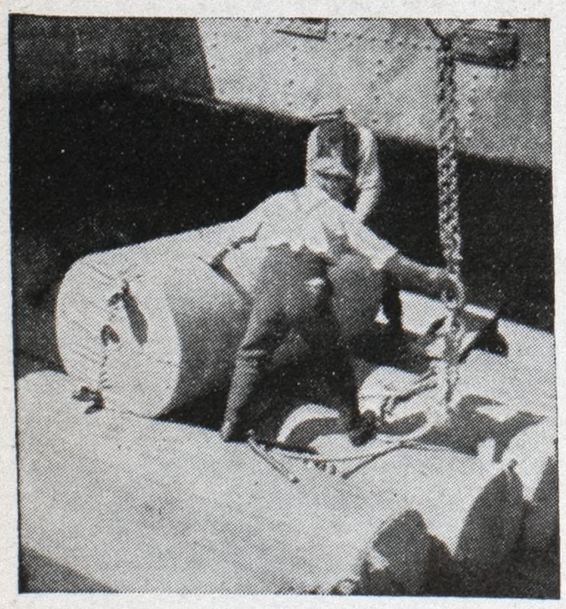

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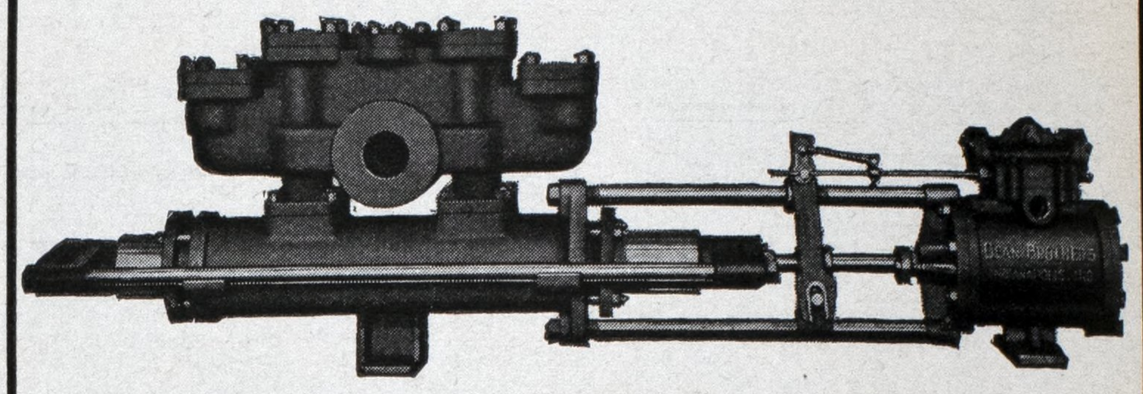

Figure No. 2311 Horizontal Single Style Double Acting Outside End Packed Plunger Trombone Pot Valve Pump For Boiler Feed & Pressure Service.

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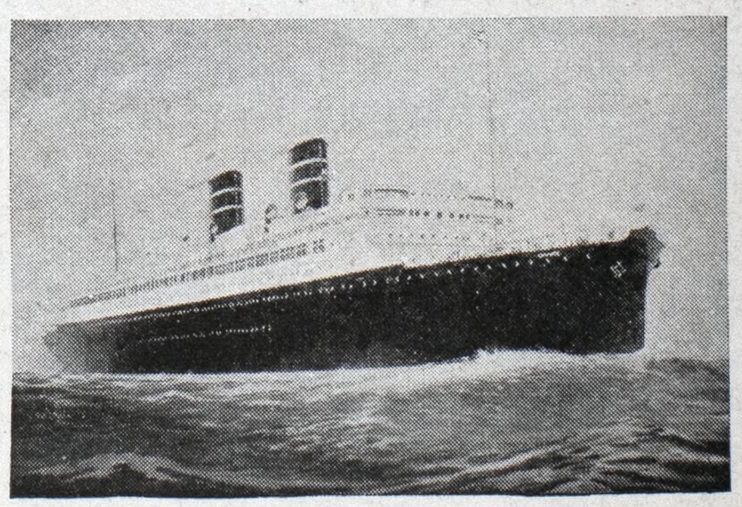

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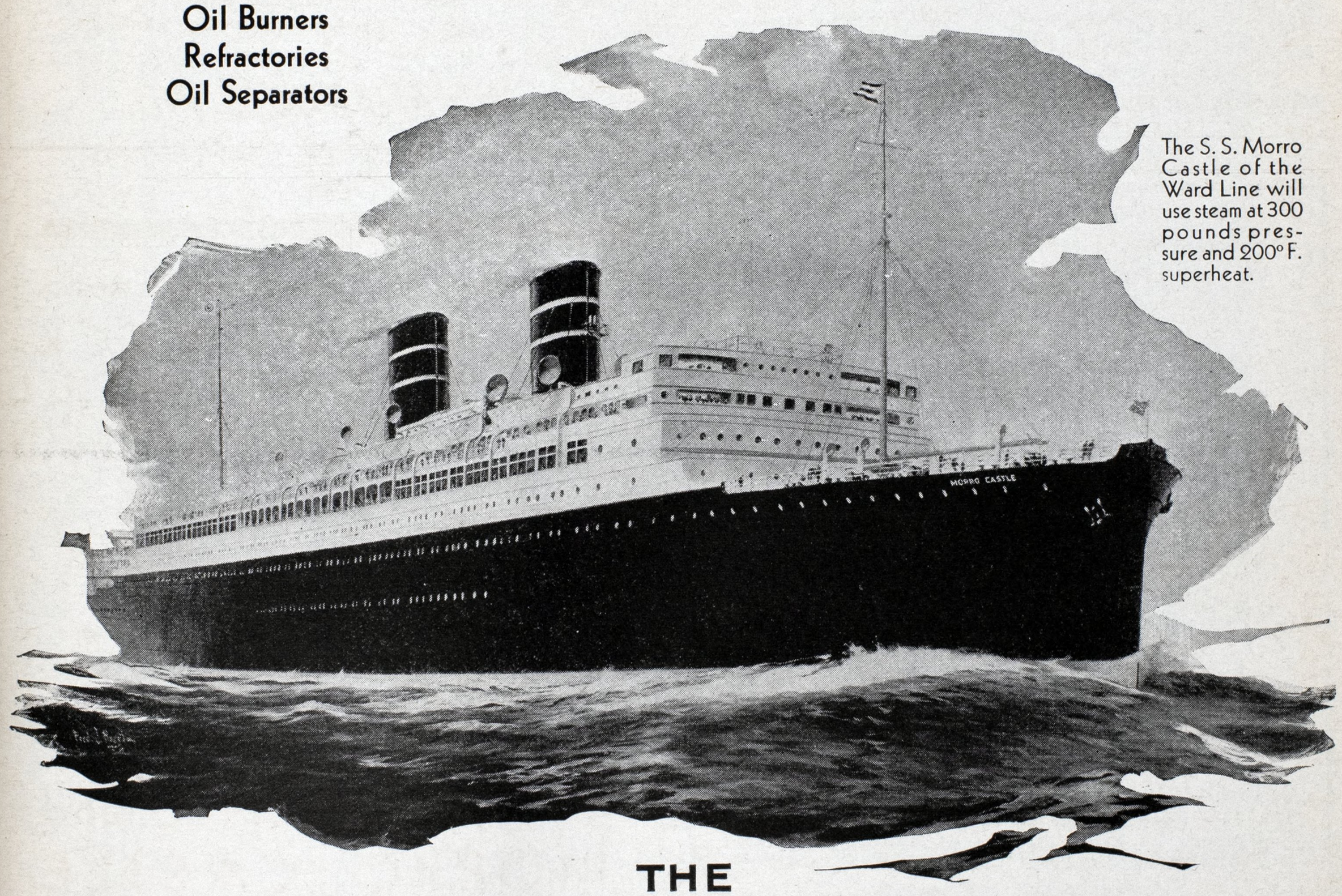

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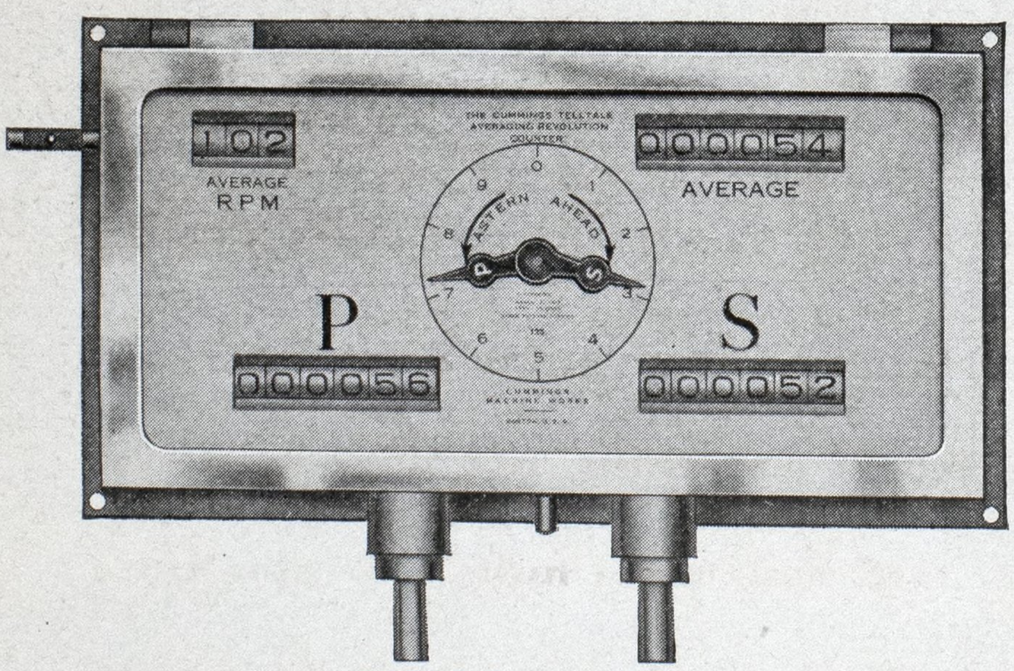

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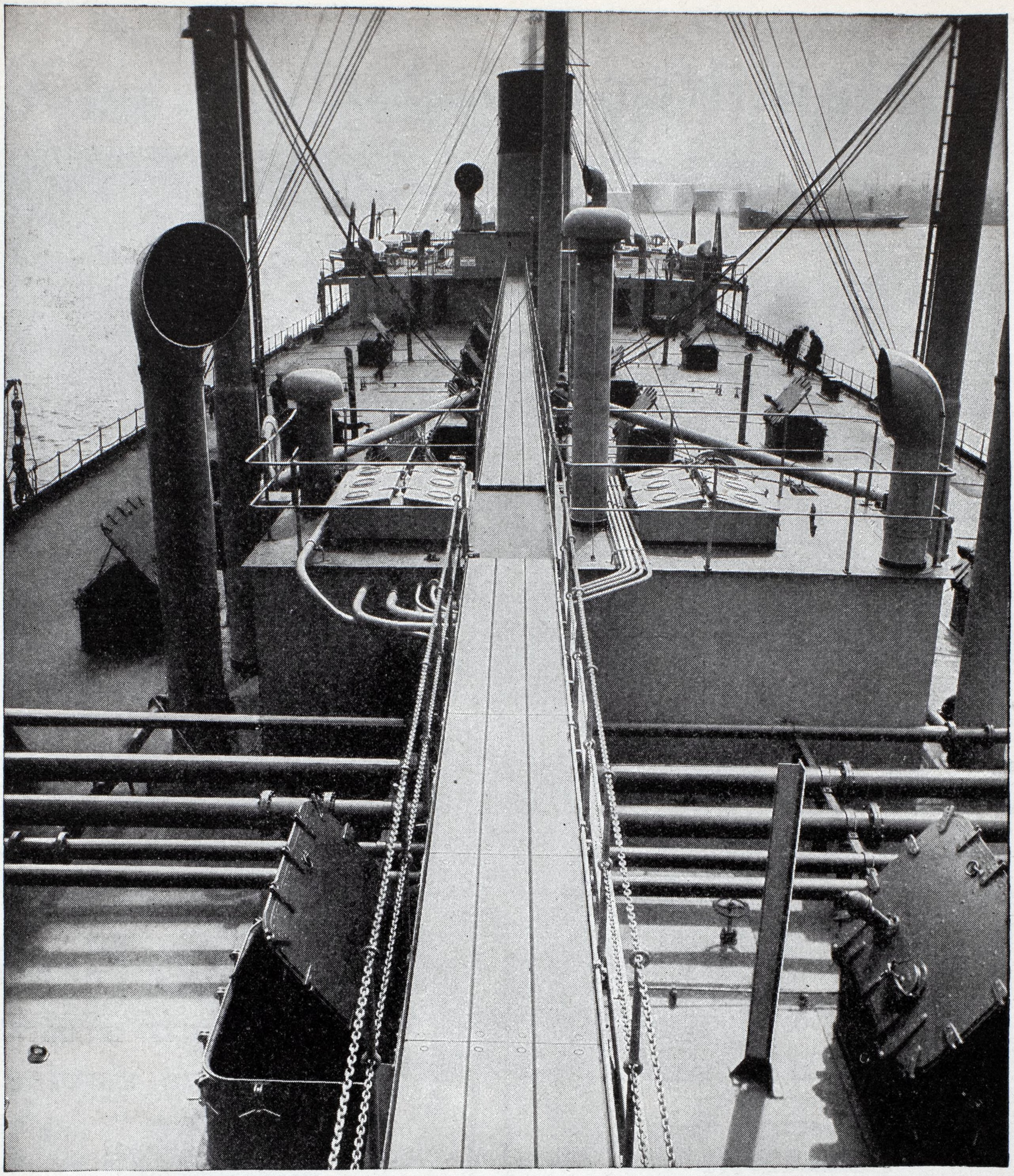

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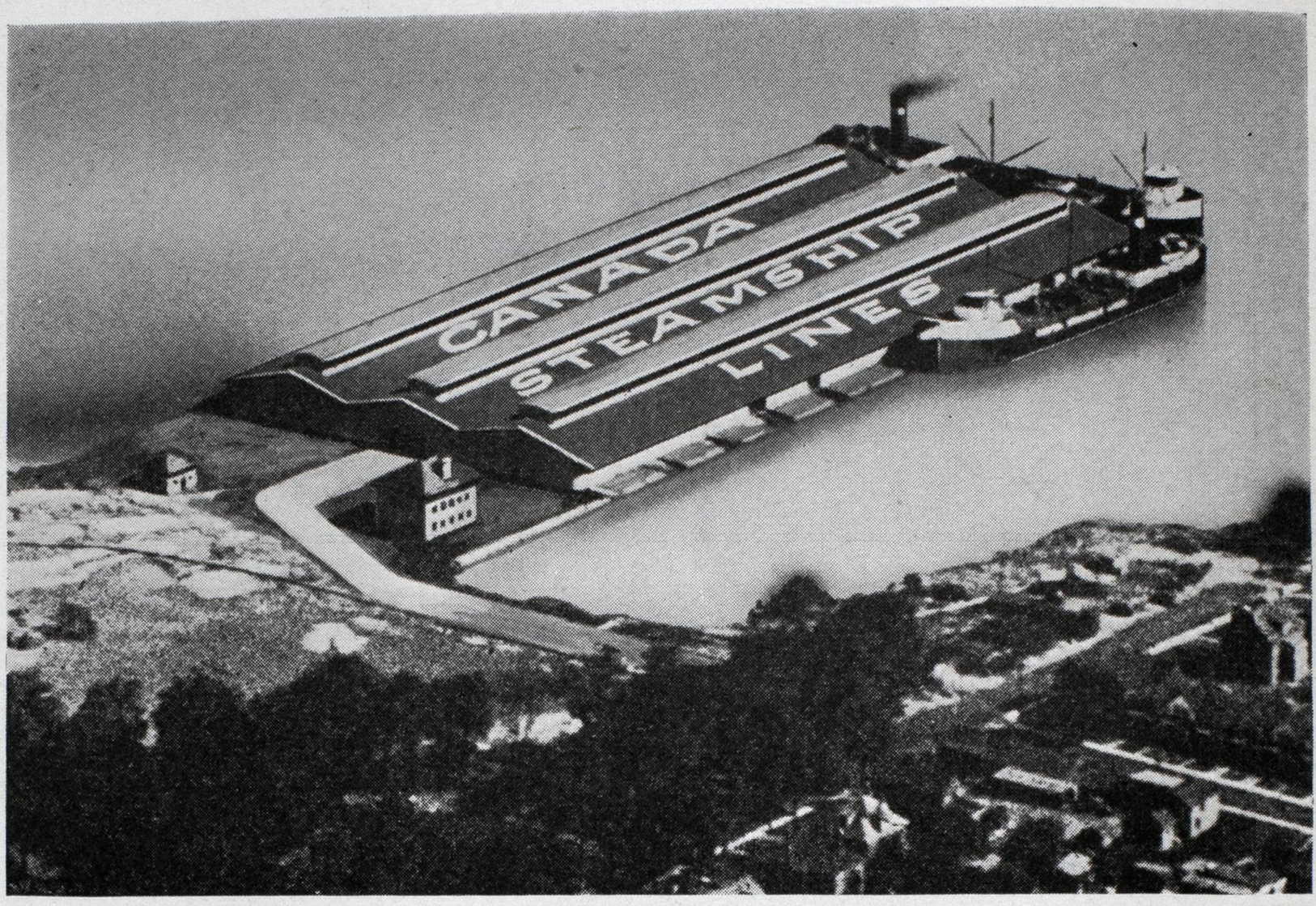

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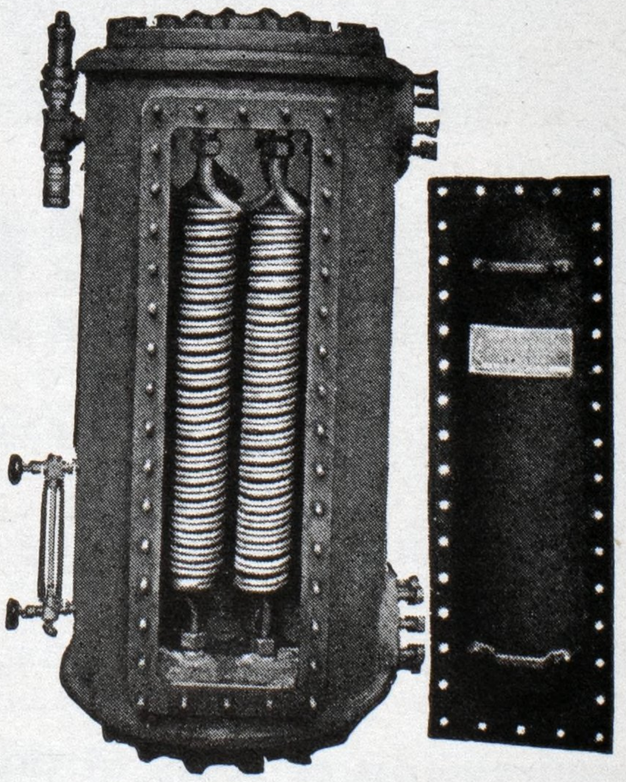

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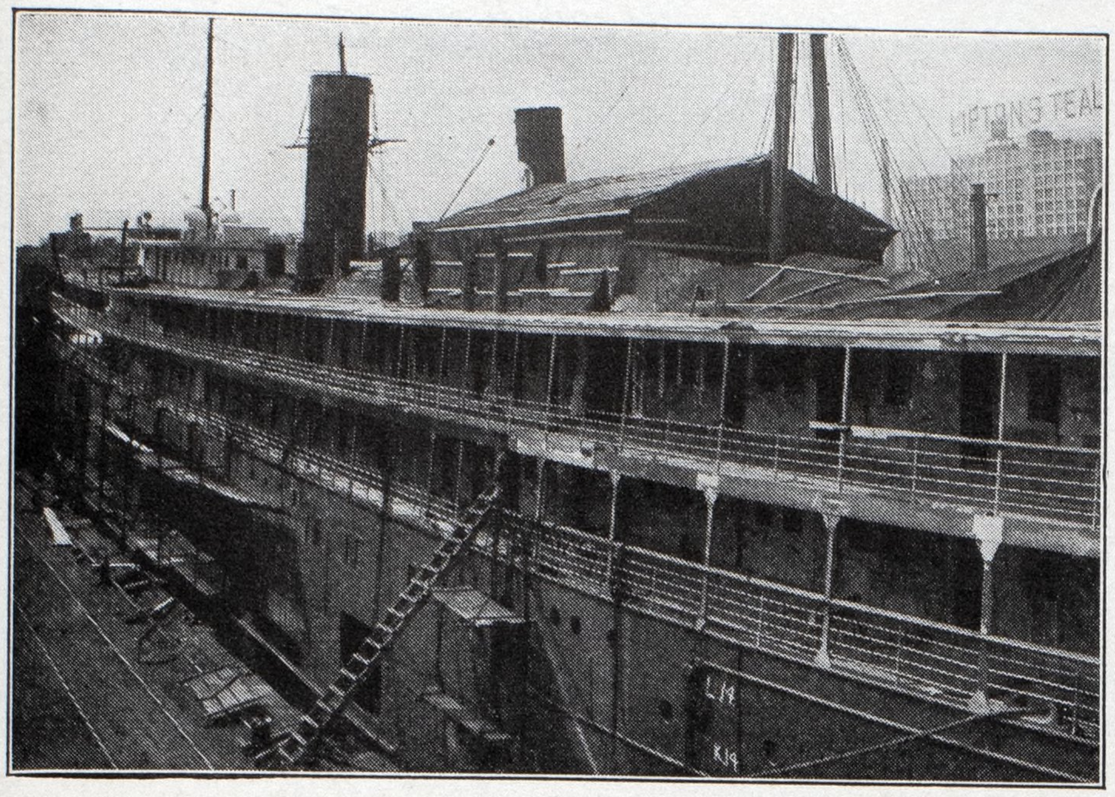

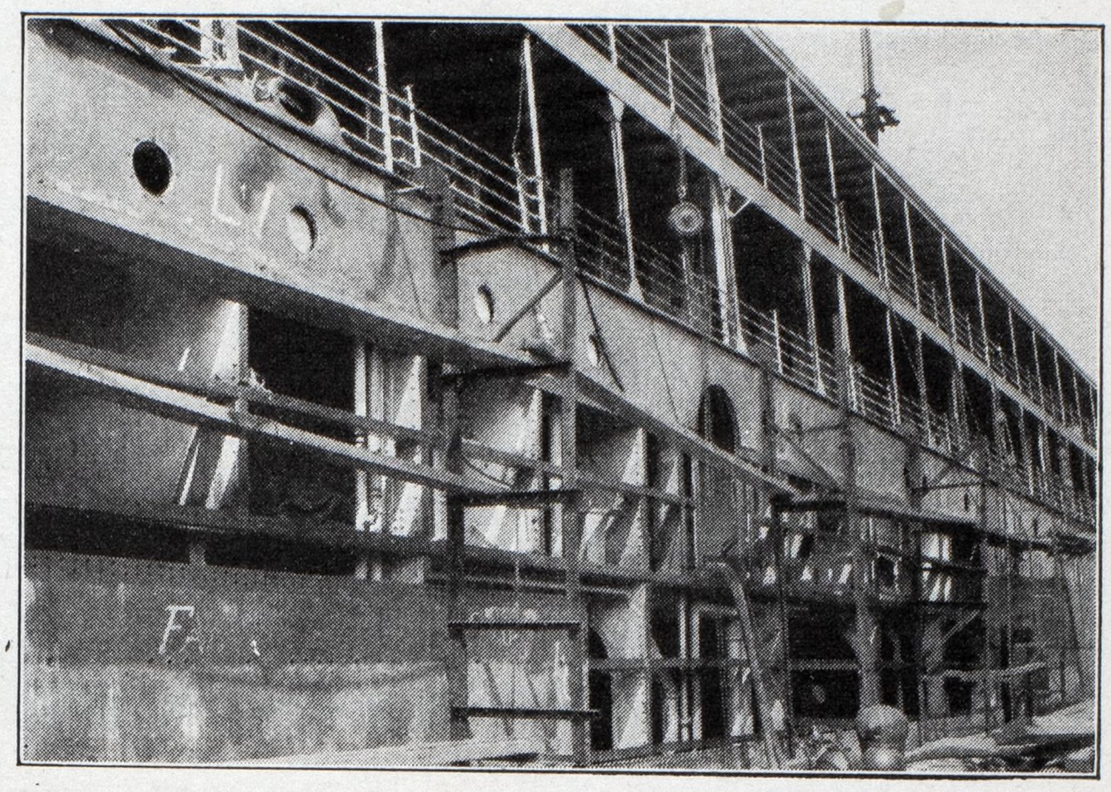

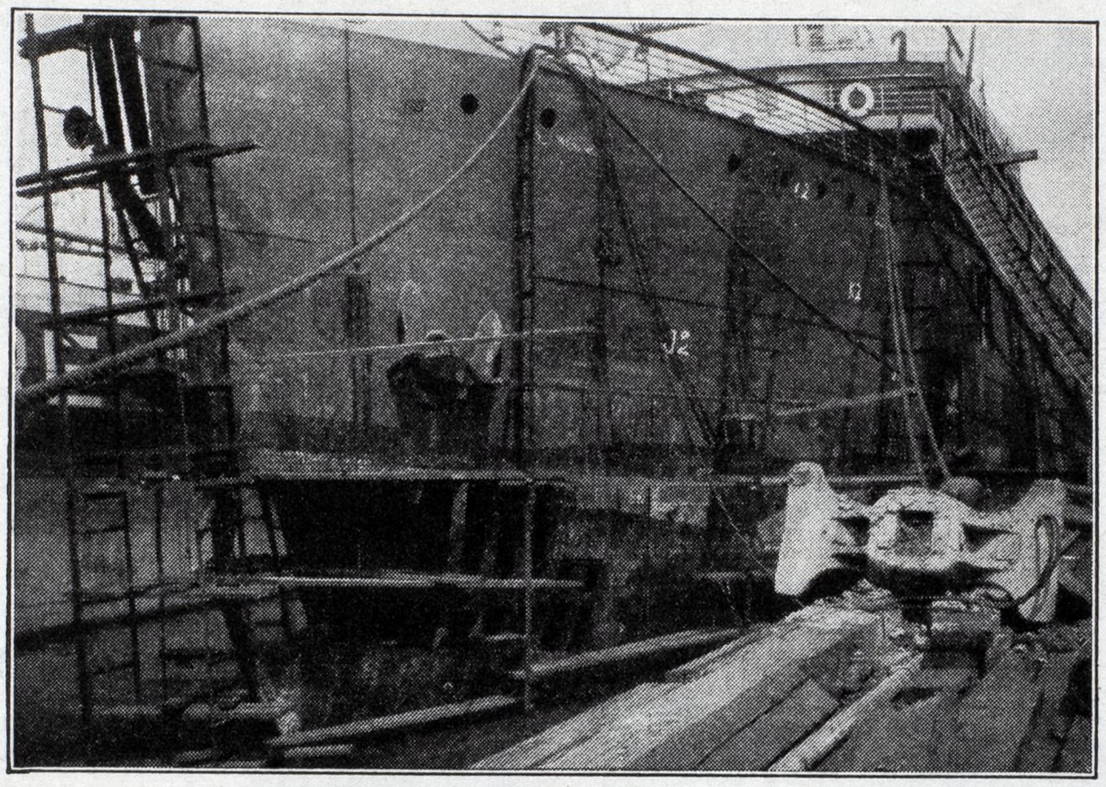

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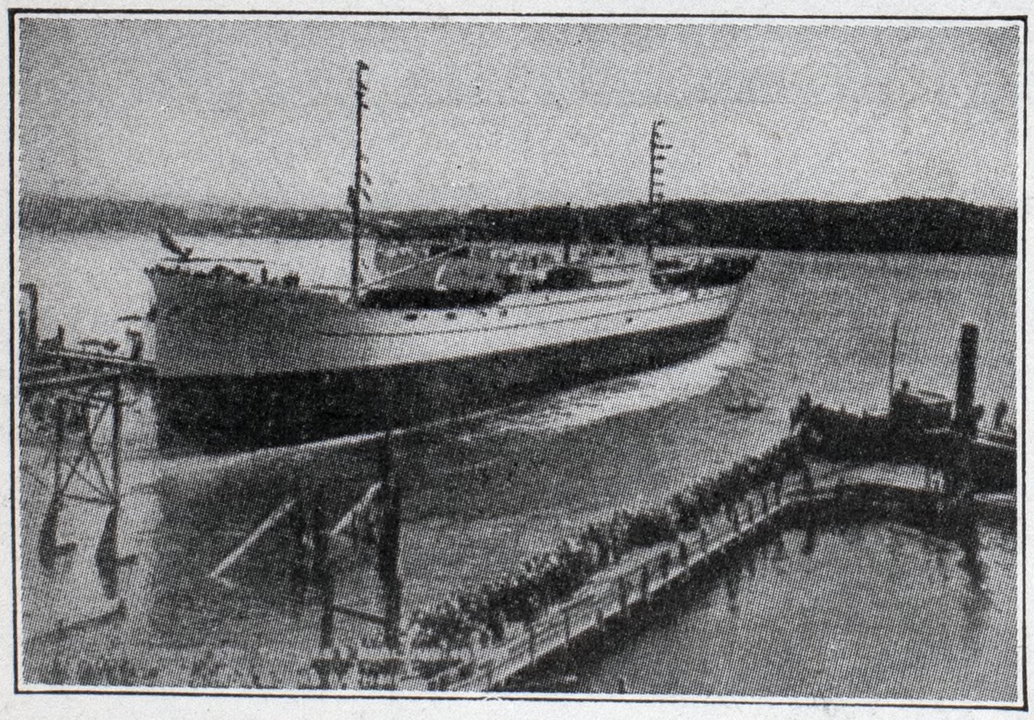

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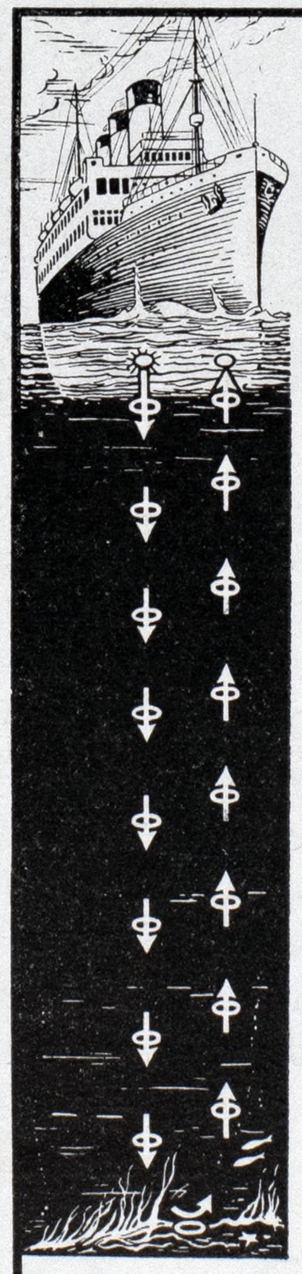

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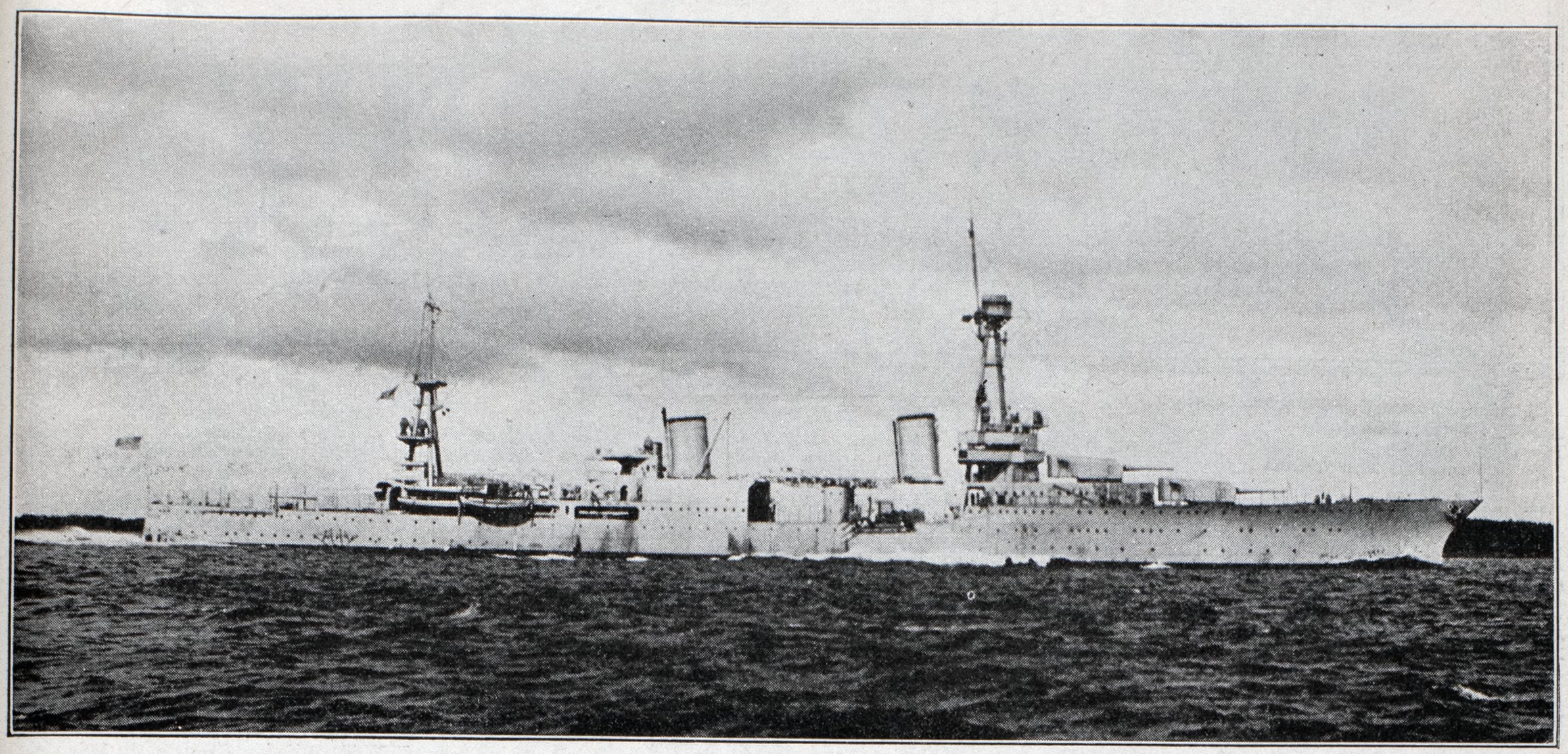

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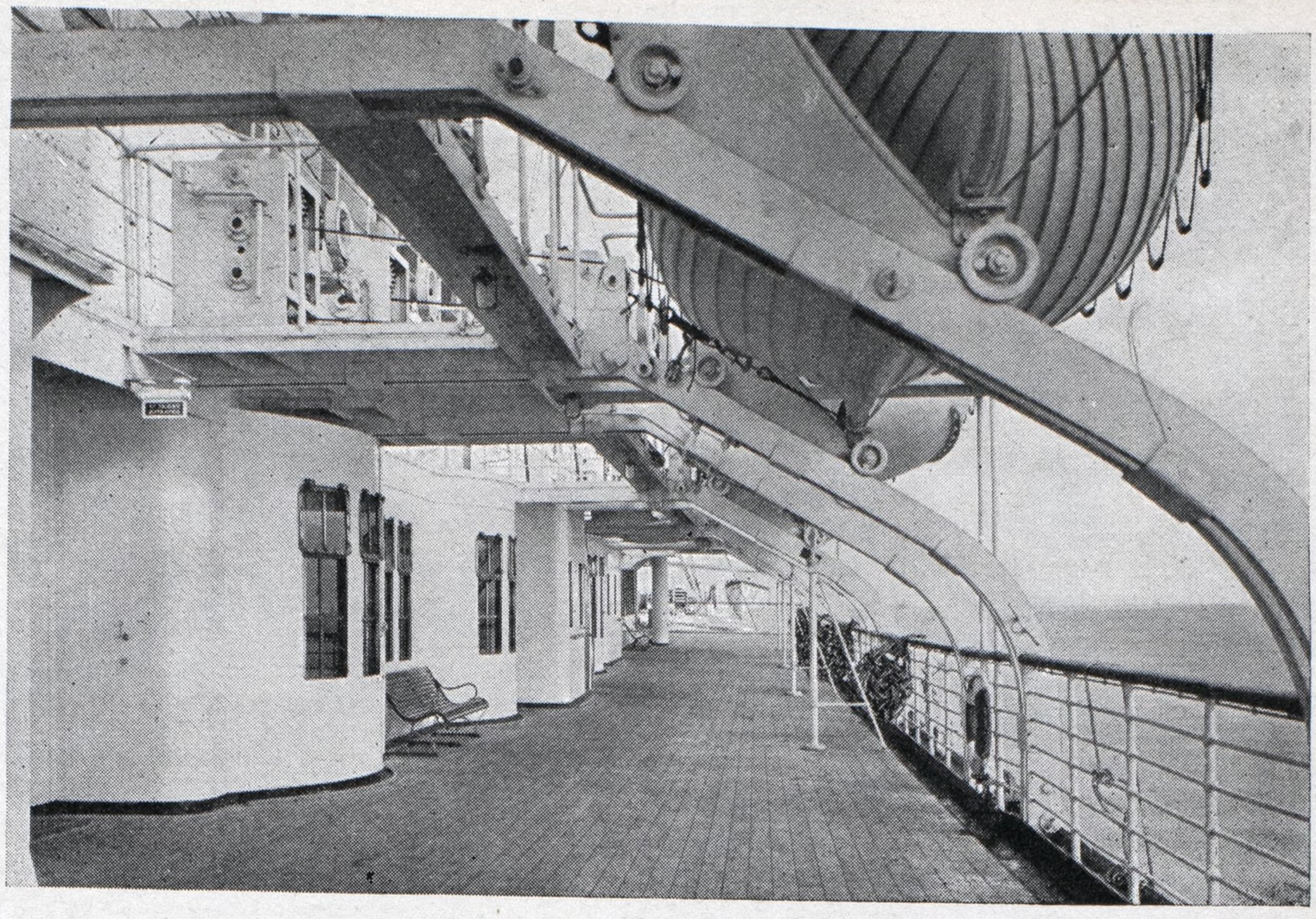

View of a Modern Boat-deck.

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305 VERNON AVENUE

LONG ISLAND CITY, N. Y

Agents
Upson-Walton Co.
Cleveland, Ohio
C. V. Lane,
S. F. Cal.

Manufacturers of
Welin Davits,
Norton Davits,
Metallic Lifeboats,
Lundin Lifeboats,
A. B. C. Floats, etc.

a watched bearing seldom overheats

But who wants to keep an eye —or a hand—on a bearing to be sure it doesn't, when Dixon's Graphite Cup Grease spreads its cooling, smooth, wear-resisting lubrication to every part of the bearing.

In Dixon's Graphite Cup Grease, finely pulverized Flake Graphite—itself a lubricant—is combined with the finest quality greases. Flake Graphite, brought to the bearing surfaces, takes the load and wear — prevents overheating and scoring. There's economy in such lubrication.

Dixon's Graphite Cup Grease is made in six degrees of hardness—No. 3 is recommended for general use

Give Dixon's Graphite Cup Grease a trial on any bearing —you won't have to nurse it to keep it cool.

Write for Circular No. 81-R

OTHER DIXON GRAPHITE PRODUCTS

Flake Graphite	Belt Dressing
Pipe Joint Compound	Graphite Seal
Waterproof Graphite Grease	Industrial Paint

JOSEPH DIXON CRUCIBLE CO.

Established 1827

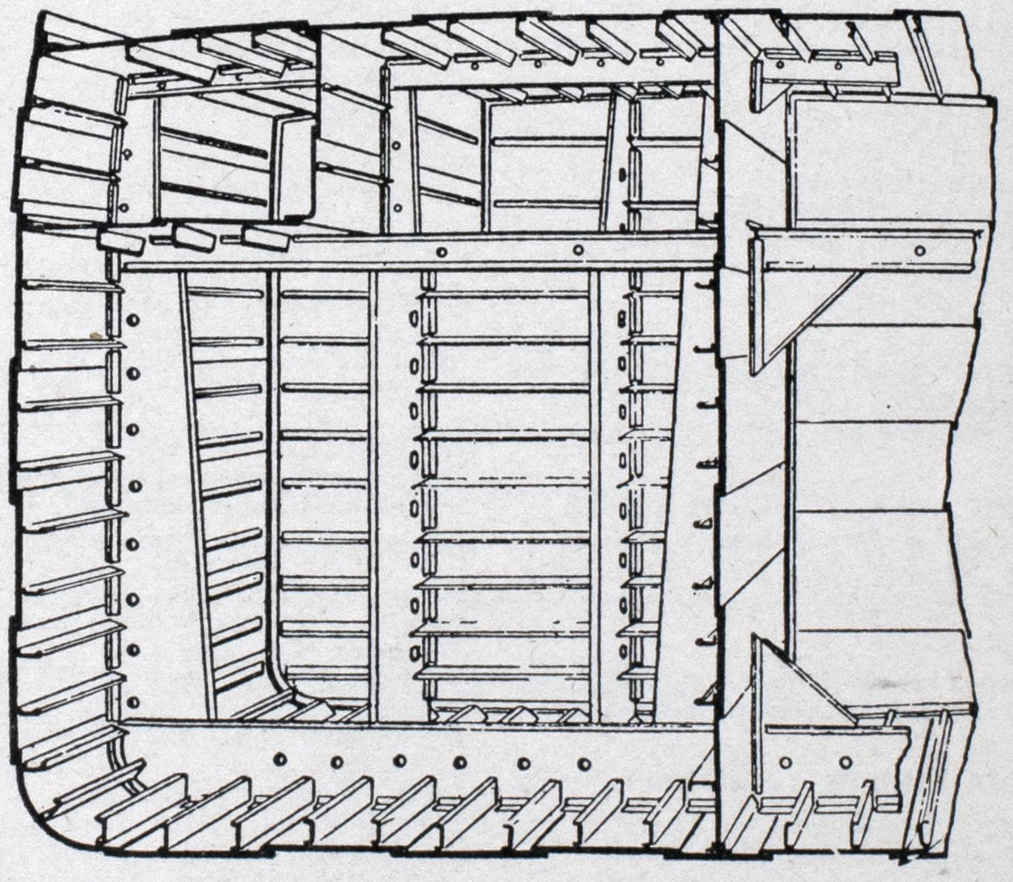
Jersey City New Jersey

DIXON'S GRAPHITE CUP GREASE

Progress in Oil-Tank Ship Construction

The "Bracketless-System"

(PATENT)



Eliminates Bulkhead Brackets
Eliminates Bulkhead Leakage
Greatly Simplifies Construction
Greatly Reduces Cost of Damage Repairs
Greatly Reduces Cost of Cleaning Tanks
Substantially Increases the Longitudinal Strength
Beyond the Well-tried "Isherwood System"

Shipowners are advised to specify that plans and structural arrangements should be approved by

SIR JOSEPH W. ISHERWOOD & CO., Ltd.

17 BATTERY PLACE, NEW YORK
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ENGINES (Marine)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp.,
Bethlehem, Pa.
Busch-Sulzer Bros.-Diesel Engine Co.,
2nd and Utah Sts., St. Louis, Mo.
Canada Steamship Lines,
P. O. Box 2430, Montreal, Can.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.
Ingersoll-Rand Co.,
11 Broadway, New York City.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
New York Shipbuilding Co.,
Camden, N. J.
Sturtevant, B. F., Co., Inc.,
Hyde Park, Boston, Mass.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.
Todd Shipyards Corp.,
25 Broadway, New York City
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc.,
11 Broadway, New York City.

ENGINES (Oil)
Busch-Sulzer Bros.-Diesel Engine Co., 2nd and Utah Sts.,
St. Louis, Mo.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave.,
New York City.
Ingersoll-Rand Co.,
11Broadway, New York City.
Standard Motor Construction Co.,
172 Whiton St.,
Jersey City, N. J.
Sun Shipbuilding & Dry Dock Co.,
Chester, Pa.

ENGINES (Steam, Steering)
Dake Engine Co..
Grand Haven, Mich.

ENGINES (Vertical, Enclosed Self Oiling)
Troy Engine & Machine Co.,
Troy, Pa.

EUROPEAN STEAMSHIP LINES (Passenger and Freight)
Hamburg-American Line
39 Broadway, New York City.

EVAPORATORS
Griscom-Russell Co.,
285 Madison Ave., New York City.

FANS (Electric)
General Electric Co.,
Schenectady, N. Y.
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

FEED WATER HEATERS—See HEATERS AND PURIFIERS (Feed Water)

FEED WATER REGULATORS
Babcock & Wilcox Co.,
85 Liberty St., New York City.

FIRE BRICK
Babcock & Wilcox Co., The,
85 Liberty St., New York City.

FLOODLIGHTS (Acetylene)
Oxweld Acetylene Co., The,
30 E. 42nd St., New York City.

FLOORING
Selby, Battersby & Co.,
33rd & Arch Sts., Philadelphia.

FLOOR PLATES
Carnegie Steel Co.,
Carnegie Bldg., Pittsburgh, Pa.

FOUNDERS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
New York Shipbuilding Co.,
Camden, N. J.

FREIGHT SERVICE
Hamburg-American Line,
39 Broadway, New York City.

FUEL OIL
Standard Oil Co. of New Jersey,
26 Broadway, New York City.
Vacuum Oil Co.,
61 Broadway, New York City.

FURNITURE
Marble & Shattuck Chair Co.,
10200 Foster Ave., Cleveland, O.

FURNITURE (Metal)
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

GALLEY RANGES
Stamford Foundry Co.,
Stamford, Conn.

GEARS (Marine Equipment)
General Electric Co.,
Schenectady, N. Y.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

GENERATING SETS
Troy Engine & Machine Co.,
Troy, Pa.

GENERATING SETS (Direct Connected)
General Electric Co.,
Schenectady, N. Y.
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.
Troy Engine & Machine Co.,
Troy, Pa.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

GENERATORS
Troy Engine & Machine Co.,
Troy, Pa.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

GRAPHITE
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GRAPHITE GREASES
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GRAPHITE PAINT
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GRAPHITE PIPE JOINT COMPOUNDS
Dixon, Jos., Crucible Co.,
Jersey City, N. J.

GREASE
Vacuum Oil Co.,
61 Broadway, New York City.

GREASE (Launching)
Vacuum Oil Co.,
61 Broadway, New York City

GYPSEYS
American Engineering Co.,
Cumberland & Arimingo Sts.,
Philadelphia, Pa.

GYRO-PILOT (Automatic Steering)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

HATCH FASTENERS
Mullholland Hatch-Fastener Co.,
Marion Bldg., Cleveland, O.

HAWSERS (Manila)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co.,
46 South St., New York City.

HEATERS AND PURIFIERS (Feed Water)
Davis Engineering Co.,
90 West St., New York City.
Griscom-Russell Co.,
285 Madison Ave., New York City.
Westinghouse Electric & Mfg. Co.,
So. Philadelphia, Pa.

HEATING EQUIPMENT
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

HEATING STOVES
Stamford Foundry Co.,
Stamford, Conn.

HOISTING ENGINES
Hyde Windlass Co., Bath, Me.

HOISTS (Air)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland.
Ingersoll-Rand Co.,
11 Broadway, New York City

INDICATORS (Direction & Revolution)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

INDICATORS (Helm Angle)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

INDICATORS (Speed)
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

ICE MACHINES—See REFRIGERATING MACHINERY

INSURANCE (Marine)
Boland & Cornelius.
Marine Trust Bldg., Buffalo, N. Y.

LAMPS (Mazda and Arc)
General Electric Co.,
Schenectady, N. Y.

LIFEBOATS
Lane, C. M., Lifeboat Co., Inc.,
856 Humboldt St., Brooklyn, N. Y.
Welin Davit & Boat Corp.,
3-5 Vernon Ave.,
Long Island City, N. Y.

LIFESAVING EQUIPMENT
Lane, C. M., Lifeboat Co., Inc.,
856 Humboldt St., Brooklyn, N. Y.

LIGHTING EQUIPMENT
Westinghouse Electric & Mfg. Co.
S. Philadelphia, Pa.

LUBRICATING OIL
Standard Oil Co., of New Jersey,
26 Broadway, New York City.
Vacuum Oil Co.,
61 Broadway, New York City.

MACHINERY (Marine)
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Cooper-Bessemer Corp., The,
Grove City, Pa.
Great Lakes Engineering Works.
River Rouge, Mich.
Manitowoc Ship Building Corp.,
Manitowoc, Wis.
Maryland Dry Dock Co.,
Baltimore Md.
Toledo Shipbuilding Co., Toledo, O.

MACHINES (Sounding)
Submarine Signal Co.,
160 State St., Boston, Mass.

MACHINISTS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
Busch-Sulzer Bros.-Diesel Engine Co., 2nd & Utah Sts.,
St. Louis, Mo.
New York Shipbuilding Co.,
Camden, N. J.

MAGNETS (Lifting)
Cutler-Hammer, Inc.,
1265 St. Paul Avenue,
Milwaukee, Wis.

MANILA OAKUM—See OAKUM (Marine, Rope, Packings, Plumbers)

MARINE RAILWAY BUILDERS
Crandall Engineering Co.,
Cambridge, Mass.

MATERIAL HANDLING EQUIPMENT
Smith, Leathem D., Dock Co.,
Sturgeon Bay, Wis.

MATTRESSES
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

METERS (Gas & Air)
Cutler-Hammer, Inc.,
1265 St. Paul Avenue,
Milwaukee, Wis.

MOTOR GENERATOR SETS
General Electric Co.,
Schenectady, N. Y.
Troy Engine & Machine Co.,
Troy, Pa.
Westinghouse Electric & Mfg. Co.,
S. Philadelphia, Pa.

MOTORS (Electric)
General Electric Co.,
Schenectady, N. Y.
Troy Engine & Machine Co.,
Troy, Pa.
Westinghouse Electric & Mfg. Co.,
East Pittsburgh, Pa.

NAUTICAL INSTRUMENTS
Ritchie, E. S., & Sons,
Brookline, Mass.
Sperry Gyroscope Co., The,
Brooklyn, N. Y.

NAVIGATING INSTRUMENTS
White, Kelvin & Wilfrid O., Co.,
112 State St.. Boston. Mass.

NEON
Linde Air Products Co., The,
30 E. 42nd St., New York City.

NITROGEN
Linde Air Products Co.,
30 East 42nd St., New York City

OAKUM (Marine, Rope, Packings, Plumbers)
Stratford, George, Oakum Co.,
165 Cornelison Ave.,
Jersey City, N. J.

OIL BURNING EQUIPMENT
Babcock & Wilcox Co.,
85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Sturtevant, B. F., Co.,
Hyde Park, Boston, Mass.

OIL FOR ALL PURPOSES (Marine)
Vacuum Oil Co., 61 Broadway,
New York City.

OXY-ACETYLENE APPARATUS
Oxweld Acetylene Co., The,
30 E. 42nd St., New York City

OXYGEN
Linde Air Products Co.,
30 East 42nd St., New York City.

PASSENGER SERVICE
Hamburg-American Line,
39 Broadway, New York City.

PLATES (Sheared Steel)
Alan Wood Steel Co.,
Conshohocken, Pa.

PLATES (Steel Floor)
Alan Wood Steel Co.,
Conshohocken, Pa.

PROPELLER BLADES AND HUBS
Sheriffs Mfg. Co., Milwaukee, Wis.

PROPELLER WHEELS
American Shipbuilding Co.,
Foot of W. 54th St., Cleveland, O.
Great Lakes Engineering Works,
River Rouge, Mich.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.
Sheriffs Mfg. Co., Milwaukee, Wis.
Toledo Shipbuilding Co., Toledo, O.

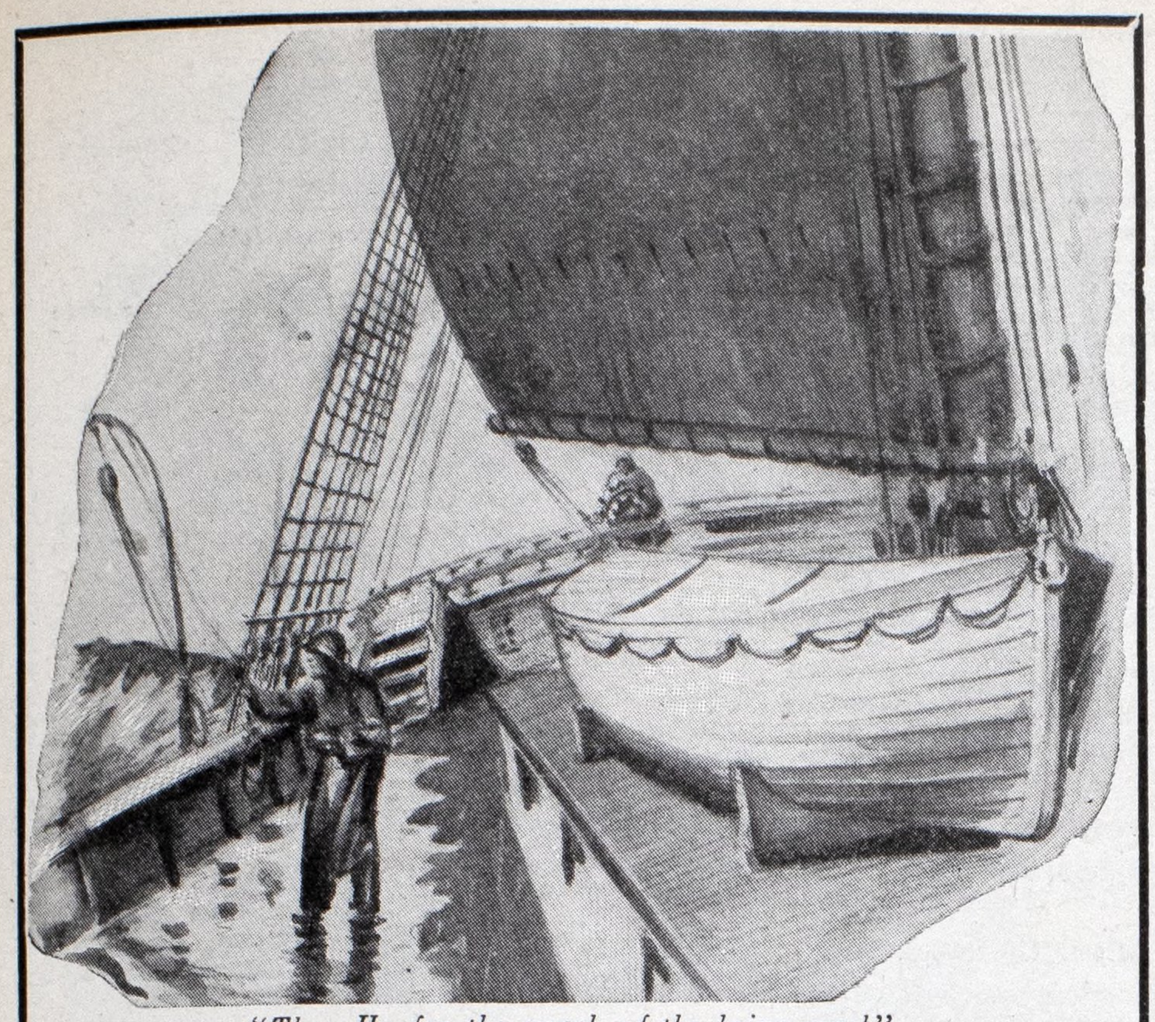
PROPELLERS
Bethlehem Shipbuilding Corp., Ltd.,
Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway,
New York City.

PULVERIZED COAL BURNERS
Fuller-Lehigh Co.,
Fullerton, Pa.
Todd Shipyards Corp.,
25 Broadway, New York City.

PULVERIZED COAL SYSTEMS
Fuller-Lehigh Co.,
Fullerton, Pa.
Todd Shipyards Corp.,
25 Broadway, New York City.

PUMPS
Dean Brothers Co.,
323 W. 10th St., Indianapolis, Ind.

See Index to Advertisements for Pages Containing Advertisements of Companies Listed Above



"Then Ho for the swash of the briny wash"

In heavy weather, a tight deck is just as important as tight seams. Poor deck caulking means ruined cargoes, wet sleeping quarters, food spoilage and many annoyances.

Caulk your deck with

STRATFORD OAKUM

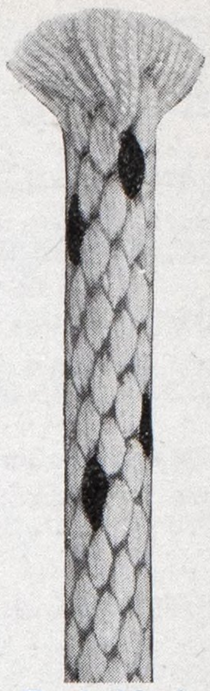
Make it as tight as your garboard.

Stratford Oakum is the world's best. It is the most economical to use. It takes less labor to caulk or spin, and "stays put" whether in bottom, side or deck. Stratford Oakum is well finished, well tarred, clean and elastic enough to keep the seam tight always.

Be sure to use Stratford Oakum.

George Stratford Oakum Company
Jersey City, New Jersey
Also Manufacturers of Cotton Wiping Waste *4

SAMSON SPOT
Log Lines



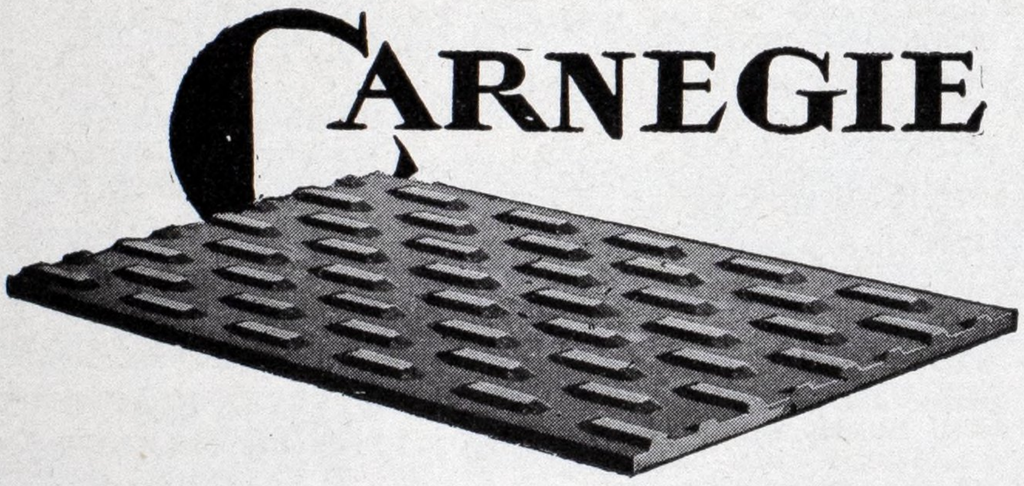
Trade Mark Reg. U.S. Pat. Off.

Smooth, tough and durable; no adulterating material to stiffen it and decrease strength and durability. Solid braided of extra quality cotton yarn. Uniform in size and quality. Easily identified by the colored spots, our trade mark.

We also manufacture flag halyards, lead lines, tiller rope; solid braided cotton cord in all sizes for various marine uses. Ask for catalog and samples.

SAMSON CORDAGE WORKS
89 BROAD STREET BOSTON, MASS.
TRADE MARK

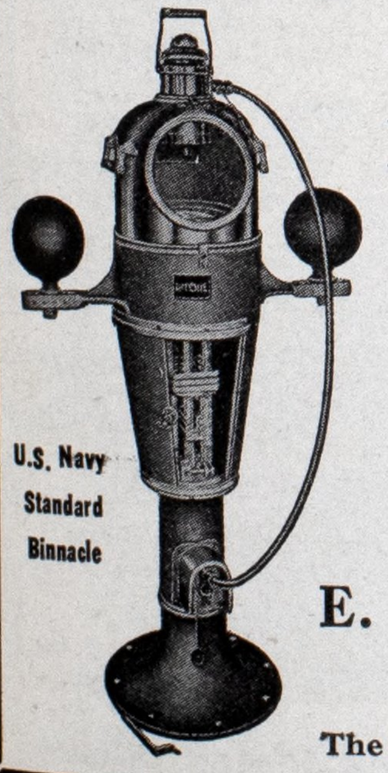
CARNEGIE FLOOR PLATE



Section M-41
Thickness—$\frac{3}{16}$" to $\frac{3}{4}$" exclusive of raised figure.
Width —6" to 66".
Weight —8.8 to 31.7 pounds per square foot.

Recommended for floors, sidewalk openings, stair and traffic treads, where a safe, secure foothold is required. This design drains and cleans easily.

CARNEGIE STEEL COMPANY
Subsidiary of UNITED STATES STEEL CORPORATION
CARNEGIE BUILDING, PITTSBURGH, PA.



THE RITCHIE LIQUID COMPASS

The Standard Liquid Compass the world over.

Used Exclusively in U. S. Navy for over 40 years.

Over 65,000 on Merchant Vessels in all parts of the world.

Made in all sizes 2 to 12" dia.

Magnets for adjusting Purposes.

E. S. RITCHIE & SONS
Brookline, Mass., U. S. A.
Agents for the Great Lakes,
The Upson-Walton Company, Cleveland, Ohio

Star Brass Mfg. Co.

53 Oliver Street -::- Boston, Mass.
MANUFACTURERS OF

Accurate "Non-corrosive" Pressure and Recording Gauges, Revolution Counters, Marine Clocks.

Dead Weight Gage Testers.

Marine, Safety and Relief Valves for all pressures.

Marine Whistles and Sirens.

Extra Heavy Renewable Globe, Angle and Check Valves.

Star Outside Spring Steam Engine Indicators.

HIGH GRADE THROUGHOUT
SPECIFY AND ORDER THE BEST.

Branches: CHICAGO PITTSBURGH NEW YORK

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Great Lakes Engineering Works, River Rouge, Mich.
Ingersoll-Rand Co., 11 Broadway, New York City.

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Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PUMPS (Bilge)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PUMPS (Boiler Feed)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PUMPS (Direct Acting)
Dean Brothers Co.. 323 W. 10th St., Indianapolis, Ind.

PUMPS (Power)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PUMPS (Steam)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PUMPS (Vacuum)
Dean Brothers Co., 323 W. 10th St., Indianapolis, Ind.

PURIFICATION SYSTEMS—See WATER PURIFICATION SYSTEMS

RADIO COMPASS AND DIRECTION FINDER
Radiomarine Corp. of America, 66 Broad St., New York City.

RADIO EQUIPMENT
Radiomarine Corp. of America, 66 Broad St., New York City.

RAFTS
Lane, C. M., Lifeboat Co., Inc., 856 Humboldt St., Brooklyn, N. Y.

RAILWAY DRY DOCKS
Crandall Engineering Co., Cambridge, Mass.

RANGES
Stamford Foundry Co., Stamford, Conn.

REFRIGERATING MACHINERY
Brunswick-Kroeschell Co., New Brunswick, N. J.
Ingersoll-Rand Co., 11 Broadway, New York City

REPAIRS
Maryland Dry Dock Co., Baltimore. Md.

REPAIRS (Electric)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

REPAIRS (Marine)
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Canada Steamship Lines, P. O. 2435, Montreal, Can.
Chicago Shipbuilding Co., So. Chicago, Ill.
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Great Lakes Engineering Works, River Rouge, Mich.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City

REPAIRS (Marine Engine)
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Electric Boat Co.-New London Ship & Engine Works, 247 Park Ave., New York City.

REPAIRS (Turbine)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

REVOLUTION COUNTERS
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.
Sperry Gyroscope Co., Manhattan Bridge Plaza, Brooklyn, N. Y.

ROPE (Manila, Net, Sisal, and Other Hard Fiber Cordage)
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

ROPE (Transmission)
Columbian Rope Co., Auburn, N. Y.

ROPE OAKUM
Stratford, George, Oakum Co., Jersey City, N. J.

RUBBER TILE
Selby, Battersby & Co., 33rd & Arch Sts., Philadelphia.

RUST PREVENTATIVE (Oil)
Vacuum Oil Co., 61 Broadway, New York City.

SAFETY VALVES (Marine)
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

SCHOONERS (Auxiliary)
American Shipbuilding Co., Foot of W. 54th St.. Cleveland.
Toledo Shipbuilding Co., Toledo, O.

SEARCHLIGHTS (High Intensity)
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SEARCHLIGHTS (Incandescent and Arc)
General Electric Co., Schenectady, N. Y.
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SELF UNLOADING EQUIPMENT
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.

SEPARATORS (Oil)
Babcock & Wilcox Co., 85 Liberty St., New York City.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.

SHEETS (Blue Annealed)
Alan Wood Steel Co., Conshohocken, Pa.

SHIPBUILDERS
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bath Iron Works Corp., Bath, Me.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Canada Steamship Lines, P. O. Box 2430, Montreal, Can.
Collingwood Shipyards, Inc., Collingwood, Ont., Canada.
Great Lakes Engineering Works, River Rouge, Mich.
Manitowoc Ship Building Corp., Manitowoc, Wis.
Maryland Dry Dock Co., Baltimore, Md.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
New York Shipbuilding Co., Camden, N. J.
Smith, Leathem D., Dock Co., Sturgeon Bay, Wis.
Sun Shipbuilding & Dry Dock Co., Chester, Pa.
Todd Shipyards Corp., 25 Broadway, New York City.
Toledo Shipbuilding Co., Toledo, O.
United Dry Docks, Inc., 11 Broadway, New York City.

SHIPBUILDING SYSTEMS
Isherwood, J. W., & Co., Ltd., 17 Battery Place, New York City.

SHIP STABILIZERS
Sperry Gyroscope Co., The, Brooklyn, N. Y.

SIGNALS (Submarine)
Submarine Signal Co., 160 State St., Boston, Mass.

SOUNDING MACHINES
Submarine Signal Co., 160 State St., Boston, Mass.

SPRINGS (Box, Bed)
Simmons Co., The, 666 Lake Shore Drive, Chicago, Ill.

SPUN OAKUM
Stratford, George, Oakum Co., Jersey City, N. J.

STEAMSHIP LINES (Passenger and Freight)
Hamburg-American Lines, 39 Broadway, New York City.

STEAM GAGES
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass.

STEAM TRAPS
Davis Engineering Co., 90 West St., New York City.

STEEL BARGES—See BARGES (Steel)

STEEL TANKS
Brunswick-Kroeschell Co., New Brunswick, N. J.

STEERING ENGINES
Hyde Windlass Co., Bath, Me.

STEERING GEARS
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Hyde Windlass Co., Bath, Me.

STOKERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

STORAGE BATTERIES—See BATTERIES

STOVES
Stamford Foundry Co., Stamford, Conn.

SUPERHEATERS
Babcock & Wilcox Co., The, 85 Liberty St., New York City.

SWITCHBOARDS
General Electric Co., Schenectady, N. Y.
Troy Engine & Machine Co., Troy, Pa.
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

TELEMOTORS
Hyde Windlass Co., Bath, Me.

TORSION METERS
Cummings Machine Works, 255 Atlantic Ave., Boston, Mass.

TOWING
Moran Towing & Transportation Co. 17 Battery Place, New York City.

TOWING LINES
Columbian Rope Co., Auburn, N. Y.
Whitlock Cordage Co., 46 South St., New York City.

TRACTORS
Clark Tructractor Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4205 St. Clair Ave.. Cleveland, O.

TRANSMISSION (Rope)—See ROPE (Transmission)

TREADS (Steel Stair & Ladder)
Alan Wood Steel Co., Conshohocken, Pa.

TRUCKS
Clark Tructractor Co., Battle Creek, Mich.
Elwell-Parker Electric Co., The, 4205 St. Clair Ave., Cleveland, O.

TRUCKS (Dump)
Clark Tructractor Co., Battle Creek, Mich.

TURBINES (Electric)
General Electric Co., Schenectady, N. Y.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

TURBINES (Marine)
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

TURBINES (Steam)
DeLaval Steam Turbine Co., Trenton, N. J.
Newport News Shipbuilding & Dry Dock Co., 233 Broadway, New York City.
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.
Westinghouse Electric & Mfg. Co., So. Philadelphia, Pa.

TWINE AND ROPE
Columbian Rope Co., Auburn, N. Y.
Samson Cordage Works, Boston.
Whitlock Cordage Co., 46 South St., New York City.

VENTILATING EQUIPMENT
Sturtevant, B. F., Co., Hyde Park, Boston, Mass.

WATER PURIFICATION SYSTEMS
Griscom-Russell Co., 285 Madison Ave., New York City.

WELDERS (Electric Arc)
Westinghouse Electric & Mfg. Co., S. Philadelphia, Pa.

WELDING & CUTTING APPARATUS (Oxy, Acetylene, Oxy-Gas)
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

WELDING GAS
Prestolite Co., The, Inc., 30 E. 42nd St., New York City

WELDING SUPPLIES
Oxweld Acetylene Co., The, 30 E. 42nd St., New York City

WHISTLES
Star Brass Mfg. Co., 53 Oliver St., Boston, Mass

WINCHES
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

WINDLASSES
American Shipbuilding Co., Foot of W. 54th St., Cleveland.
Bethlehem Shipbuilding Corp., Ltd., Bethlehem, Pa.
Dake Engine Co., Grand Haven, Mich.
Hyde Windlass Co., Bath, Me.

WIRELESS MESSAGE SERVICE
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WIRELESS SETS AND APPARATUS
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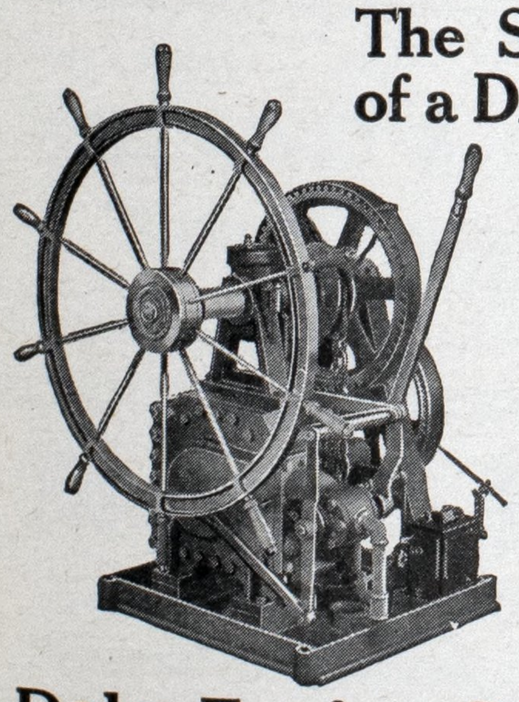

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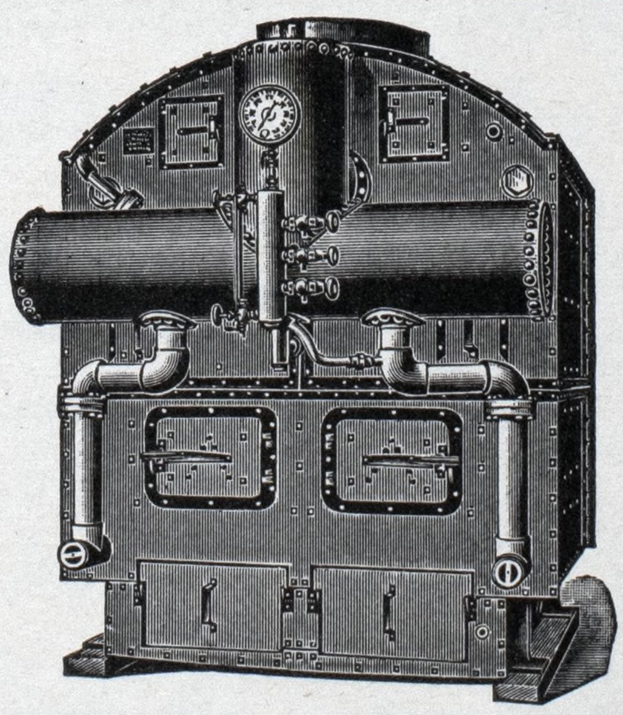

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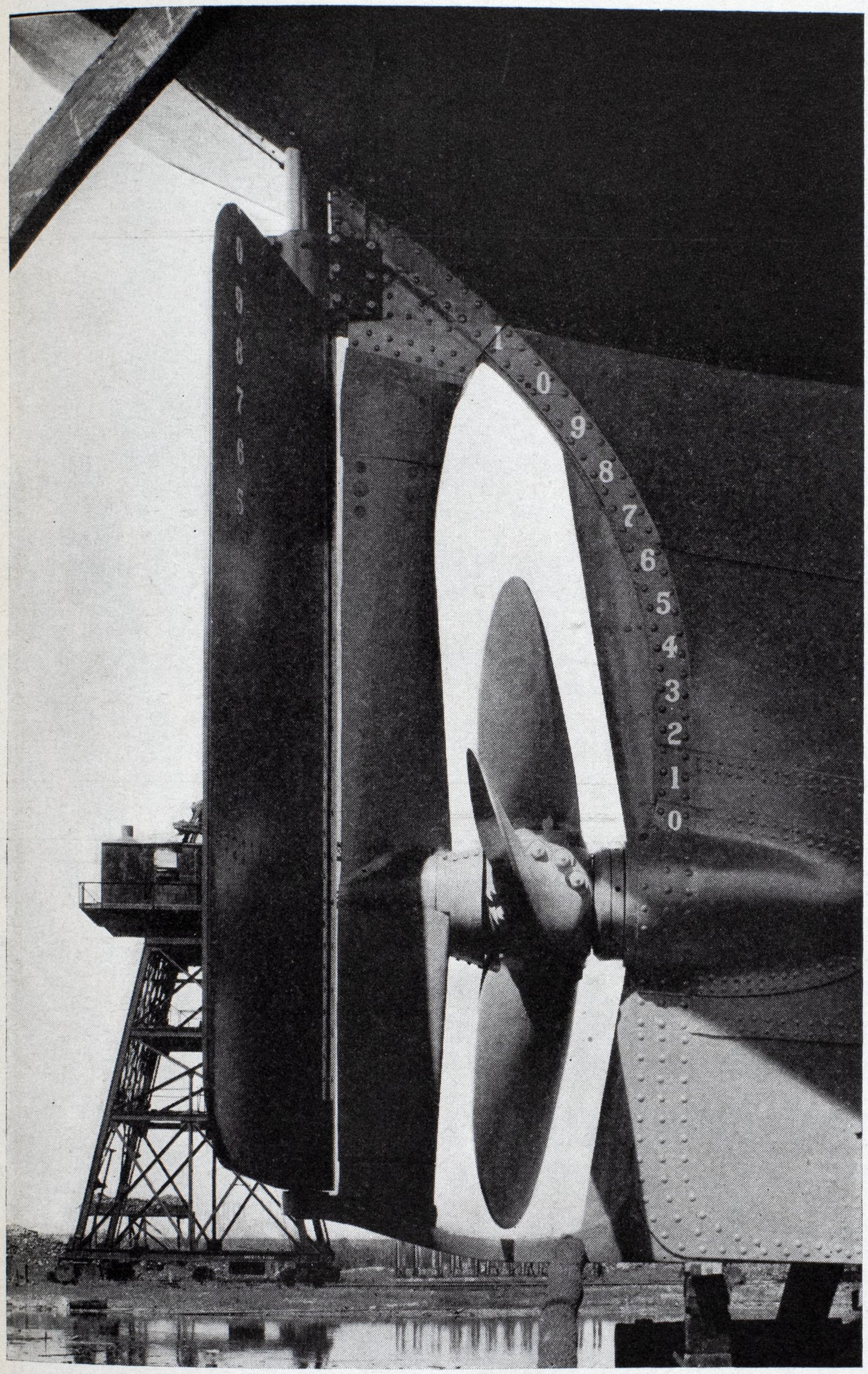

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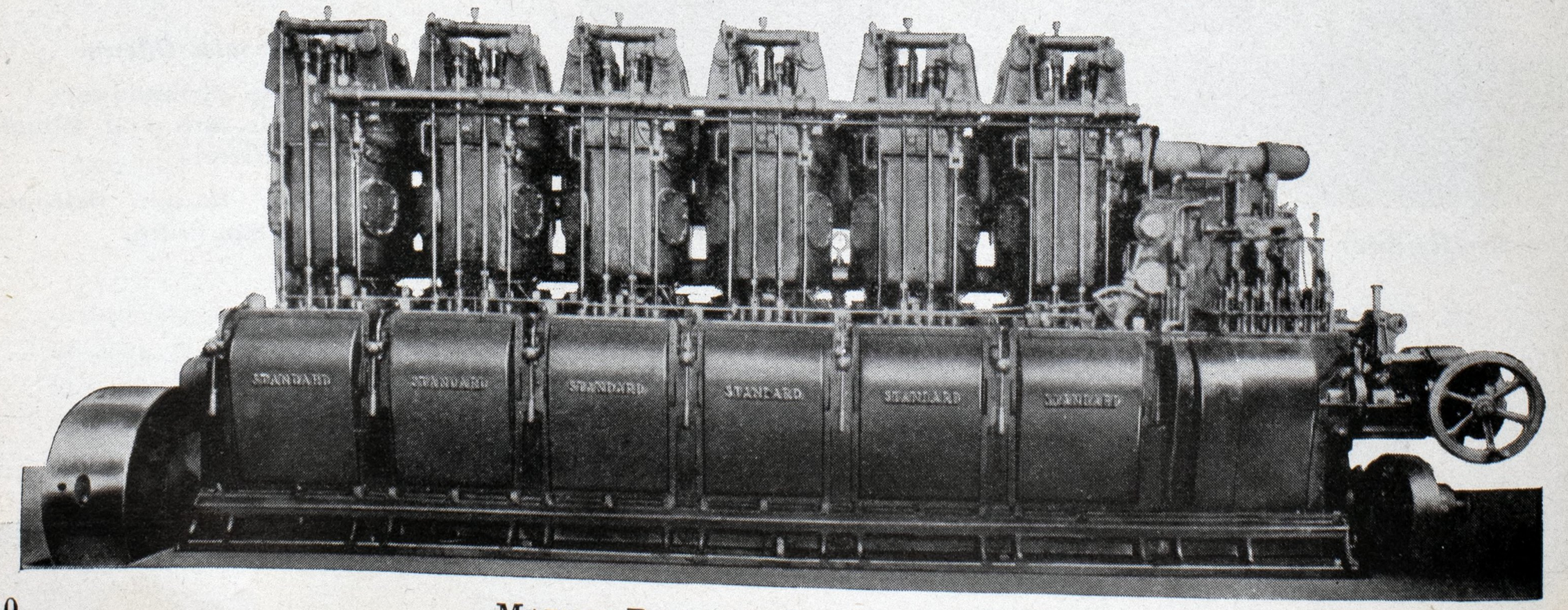

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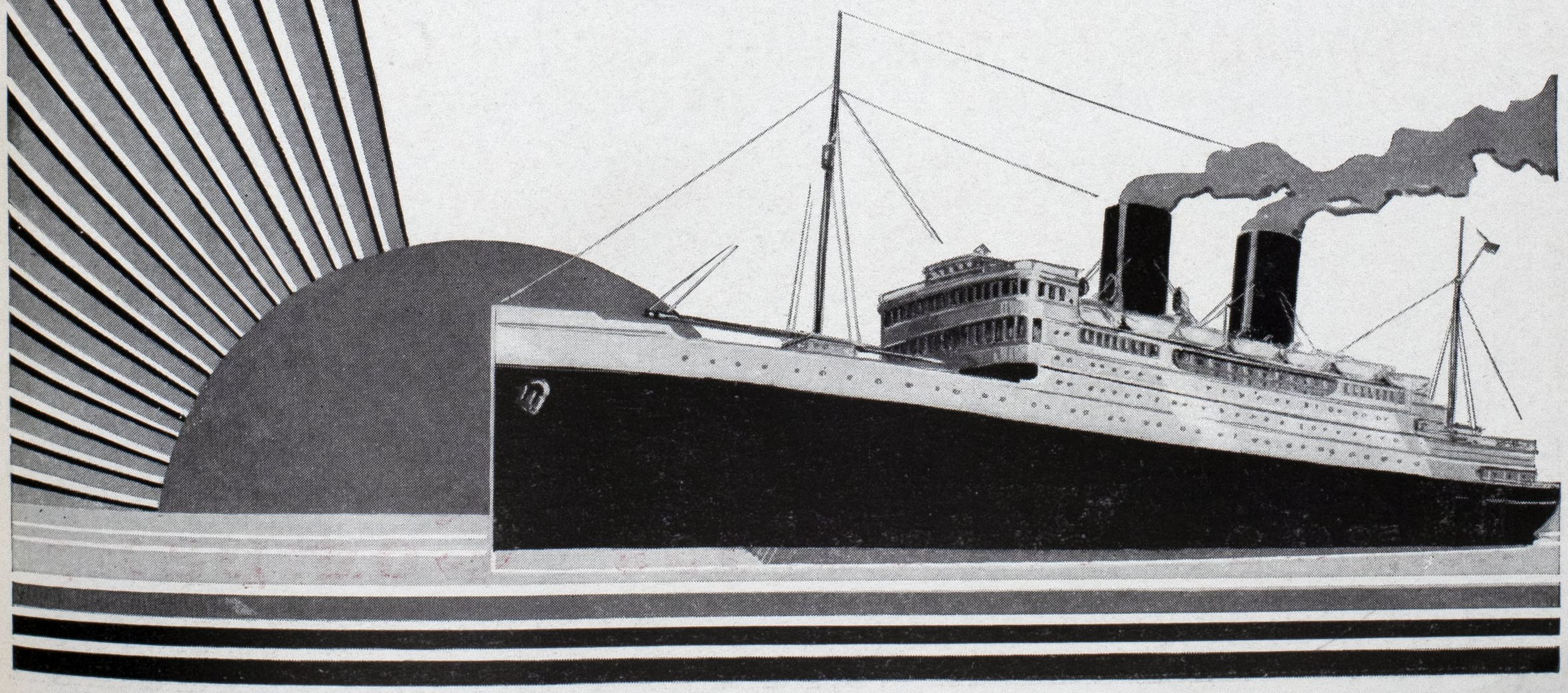

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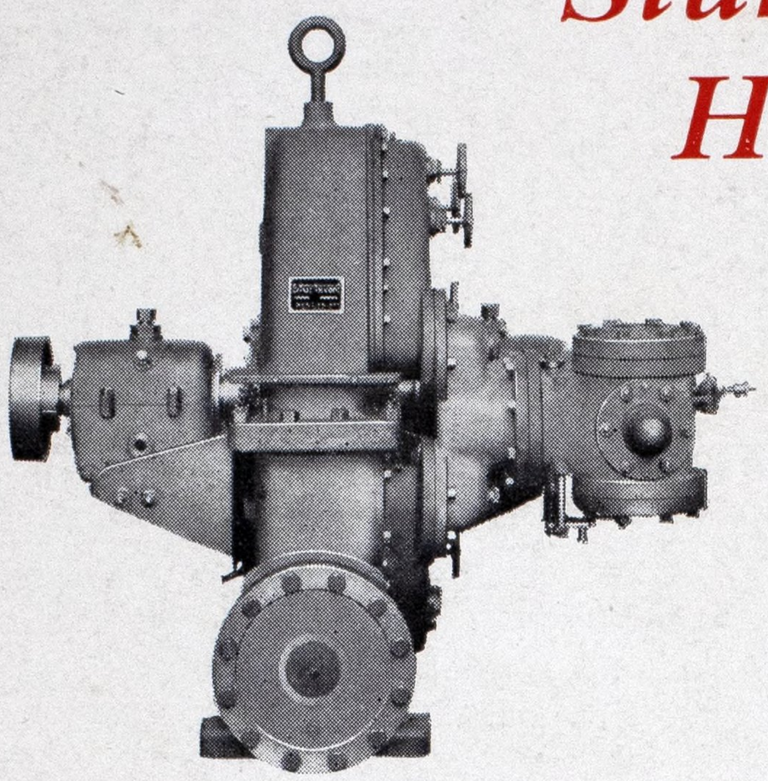

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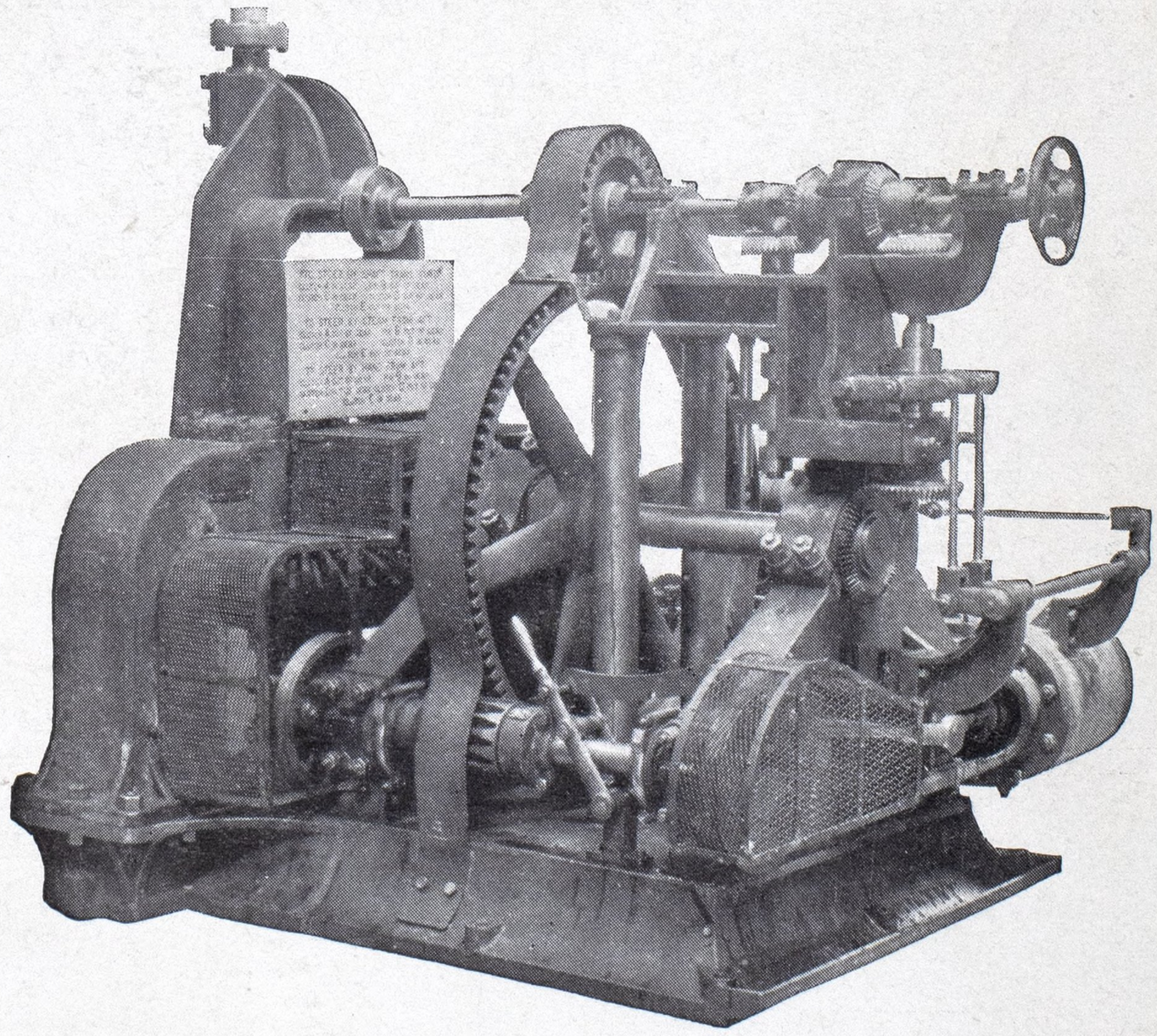

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